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THE INDUSTRIAL-ARTS MAGAZINE

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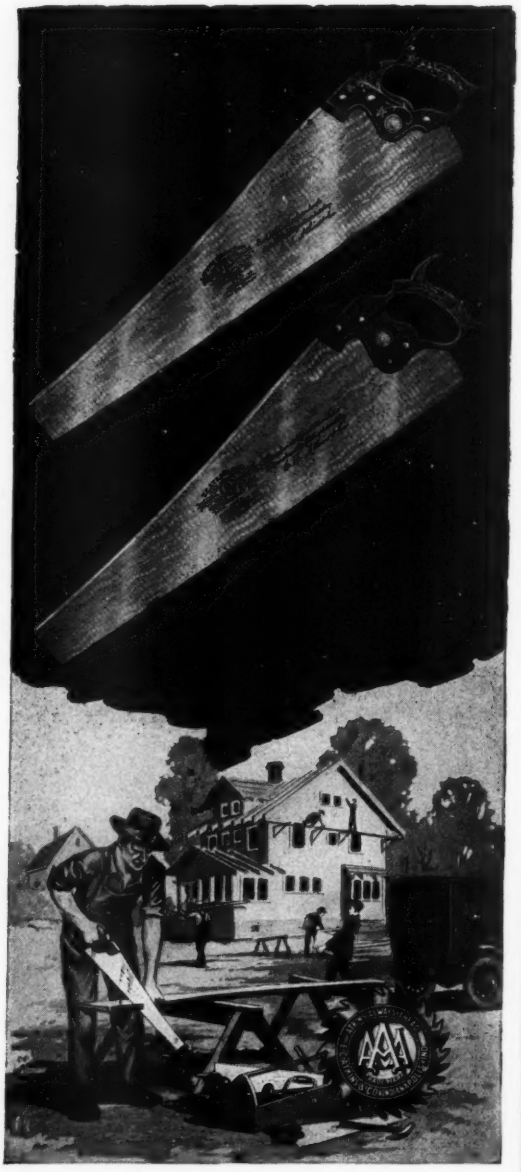

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Tests in Manual Subjects

Prof. D. J. McDonald, University of Cincinnati, Cincinnati, O.

WE are indebted to Charles Lamb, if I remember correctly, for the delightful story of how our antipodal neighbors learned a rather expensive method of preparing roast pork. It need not be pointed out in this connection that all too often in our individual lives the moral of Mr. Lamb's story finds abundant application. Particularly is this true when one is engaged in an activity which tends to become routine in character, taken care of by the lower brain centers, as it were. The readers of this magazine well know that unfortunately the high calling of teaching is subject to this stagnating tendency.

As I have studied the field of manual subjects during the past decade I have been forced to admit over and over that here is just another case of blindly following an established practice rather than breaking away from precedents, doing some real thinking, and working out a technique consistent with the inherent nature of the subject matter. How teachers of manual subjects have reacted to my suggestion that tests should be given in their field as well as in other fields has been indicated in another connection;[1] likewise how a change of mind resulted in some of them when the fundamental principles underlying all mental development were pointed out. At that time I assumed a general acceptance of the claim that correctly devised and properly conducted tests might prove profitable to all concerned. But since I propose to treat the question somewhat comprehensively at this time, it will be advisable to mention the important psychological principles upon which my former assumption was based.

Reasons for Recommending Tests.

I offer no apology for pointing out here that among the factors involved in educating one's self are:

1. Ability to acquire and retain facts, or supposed facts;

2. Ability to use these facts, or, in other words, to make them serve some definite purpose;

3. Ability to acquire, perfect, and maintain desirable motor coordinations, in short, to acquire habits, to develop skills, etc.

It is upon these, primarily, that progress depends. To illustrate: ability to read well consists essentially in (a) ability to distinguish between the various symbols and their combinations, which ability, it will be observed, is based largely upon perception and memory; (b) ability to get meaning out of the symbols which make up the printed page, in short, to tie up with life and its experiences the story which the symbols tell; (c) ability to acquire and establish the coordinations necessary for expressing the meaning of these symbols. (I purposely avoid raising the question as to the extent the establishing of such coordinations is necessary to the ability to read silently).

If now we examine these abilities for a moment it becomes apparent that the first one depends primarily upon adequate information, the second upon knowing how to make intelligent use of such information, and the third upon associations which have been worked out between mental and motor areas in the brain plus the necessary muscular controls for carrying out mental orders. Reduced to its lowest terms, all this means that, in a subject where the practice of giving tests has long been approved, the pupils are tested for any one or all of the following: The knowledge possessed, the the ability to reason or to make use of that knowledge, and habit formation or motor controls.

Let us turn now to the field of manual subjects and see whether the same or different conditions obtain in some one subject, say carpentry. Suppose we endeavor to ascertain, first of all, what, mentally and physically speaking, a first class carpenter consists of. May he not be fitly described as one who knows what to do in his field and when, how, and where to do it? If now we analyze this statement, are we not driven to the same fundamentals discovered in connection with our analysis of reading, namely, those of specific facts, specific intelligence, and specific skill? For does not the carpenter need to have adequate information regarding what tools and materials to use, when to use them, and how to use them? And does not this necessitate the possession of a special set of facts, the ability to make intelligent use of these facts, plus the motor controls (skills) necessary to accomplish with the various

[1] See Industrial Arts Magazine, October, 1919, p. 383.

tools what his interpretation of the facts tells him should be accomplished?

Usual Objections Answered.

But since it is possible, even in the face of these seemingly incontrovertible facts, that the wide-spread opposition to tests in the manual field is well-founded, the objections usually offered will be briefly considered. The one most frequently heard is that which has reference to the nature of the subject matter. It is maintained by the majority of teachers in the field that their subjects are inherently different from the three R's and other subjects in the strictly academic group and that, as a result, no necessity exists for giving formal tests. This claim as has been pointed out in the preceding paragraphs, is largely unfounded. Analysis proves beyond a shadow of a doubt that the same mental and physical powers are involved in the mastery of a subject whether it is academic or manual. The difference, in so far as there is one, rests in the extent and manner in which these faculties are employed in one subject as contrasted with another. But, let it be understood once and for all time, that the capacities and powers utilized in the separate fields have the same origin, namely perception, memory, imagination, and reasoning powers.

Another wide-spread objection is that the conditions which prevail in the average shop classroom frequently preclude the possibility of giving formal tests; or, if not that, at least the advisability of doing so. The condition to which such objectors have reference are an insufficient number of desks, tools, and machines, to meet the needs of all pupils at one and the same time. It is scarcely excusable to add that such an objection should not be taken seriously. For if it is possible to conduct classes passably well from day to day with the available equipment, then arrangements could surely be made so that all pupils might be accommodated for once only. What is lacking in such cases is the "will," not the "way."

A third objection is of more formidable character, referring as it does to the inadequate amount of time afforded in the usual examination period of one and one half or two hours. It cannot be denied that this is a valid, though by no means an insurmountable, objection. Admittedly two hours is altogether too short a period for planning and carrying through to effective completion any sizable project, particularly if it is one which necessitates the use of a fair amount of trade knowledge, trade skill, and trade intelligence. But, while this is true it is easily conceivable that the test might be organized in such a way as to give pupils the chance to get everything ready for execution during the first period and do the actual producing during the second. Or, in case the above arrangement is impossible—this would be true in many instances—tests in any one of the three phases of the subject, namely, facts, intelligence, and skill, might be given separately either during or before the period of regular examinations. To do either of these, but especially the latter, would of course necessitate careful but not at all impossible planning on the teacher's part.

A fourth and final objection is to the effect that, due to the nature of the work and the conditions under which the tests would have to be conducted, cheating could not be prevented. It may be a surprise to many teachers to read that in my opinion the exact reverse is true that, in other words, with a little intelligent planning, the opportunity to cheat might be entirely removed. Not only that, but the type of test might easily be made such that the necessity for constructive thought would tend to obviate the idea of seeking assistance in a questionable manner, a state of affairs which unfortunately cannot be brought about often enough in the field of strictly academic work. How easy it is, for example, for a teacher of manual work to change one or two dimensions upon a drawing, or modify the design slightly, thus making it imperative that each worker do his own thinking. Certainly, if the course has been acceptably organized and the teaching of approved character, a substantial number of pupils should be able to proceed without assistance, assuming, of course, that the test is what it should be. Such being true, would not the manual teacher be just as free to prevent cheating, provided this were necessary, as would the academic teacher? It is significant, I think, that in the only thorough-going experiment in testing shop pupils thus far conducted, that of Mr. Richards, cheating was conspicuous because of its absence rather than because of its presence.[2]

What the Actual Obstacles Are.

Having answered these objections one by one, it will prove helpful to consider in detail what the real objections are. Let it be understood, however, that in making this assertion I do not for a minute imply that teachers of manual subjects do not, for the most part, think that the objections raised are real enough. The first great obstacle, if my diagnosis is correct, is one that is by no means limited to the field of maunal work; rather it is as universal as teaching itself. I have reference to the general failure on the part of teachers to appreciate the real purposes and possibilities of tests in school work. And naturally, since their purpose is not clearly seen they are not adequately planned for. How many teachers, to put it concretely, see the objectives of their teaching efforts in terms of acquired facts, capacity for and ability to master new situations, established coordinations, and approvable attitudes? Again, how many teachers, regardless of the subject taught, have a definite conception as to the standards which should be (or need be) attained in a specific subject? To be even more specific, who knows how many facts a carpenter needs to know, how skillful he needs to be, and the amount of intelligence he needs to possess, specific or otherwise, before he can be pronounced

[2]The Gary Public Schools. Report on Industrial Work. C. R. Richards.

an expert in his line? As is now well known the only worth while attempt to answer this question occurred while the army trade tests were being devised. The best that can be said of any other ventures along the same lines is that they were scattering and unscientific. The aggravating fact is that until the last few years we were almost entirely without standards of achievement in the different school subjects; and, so far as the writer is aware, this statement still applies to the field of manual subjects. It cannot be denied that, barring a few scattered teachers, who despite what takes place are shining lights in their profession, the average teacher of manual work lacks definite objectives. Truly he is on his way but does not know where he is going. It is only the rarest kind of teacher who thinks of his subject in terms of the knowledge, intelligence, and skill essential to a mastery of successive units of that subject.

The second great obstacle rests upon the fact that shop teachers as a class are not given to close analysis. As a direct consequence of this they do not conceive of the pupil's progress except, as has been hinted above, in a loose and vague way. They do not, for example, conceive of the objectives of education in the same terms that the later employers of their pupils do. For some unwarranted, though not unexplainable, reason they, despite the special type of work they are doing, attach too little vocational significance to that work. They somehow forget that when John or William secures an opportunity to earn some money the test each of them will be up against will have no if's and and's attached thereto; that rather it will call upon their resources in a way that they have not been called upon before. They need to be reminded much more often that while the employer attaches value to facts, he attaches much more value to ability and disposition to use the facts possessed in the solving of new problems. They need to be told that in the average shop or office no provision is made for some one to stand over or near new employees to guide their every action; that, on the contrary, new recruits are expected to size up the situations they face, to show speed if it should be shown, to be accurate if the job demands it, to be resourceful if it is necessary, and so forth. Finally, they need to have it dinned into their ears daily that the only sure way of preparing pupils for the great practical tests of life is to place them in situations while they are in the school shop which closely resemble those they must later face.

It is to these shortcomings and misconceptions, in my judgment, rather than to the objections usually heard that the prevailing antagonism is largely due. Moreover, I feel sure that when shop teachers see the light sufficiently to start to work in terms of the practical objectives cited, those which, regardless of school ideals and practice, the cold world insists upon setting up as measuring sticks they will appreciate what I am contending for and will act accordingly. Then and then only will the bugaboo of insufficient time to cover the required number of set lessons, completing the standard number of blue prints, and turning out the usual number of exercises, disappear.

Knowledge Phase Greatly Underemphasized.

At the expense of a seeming digression I want to register once more a protest against the universal tendency to neglect the informational side of shopwork. It is the rule rather than the exception for manual teachers to treat the knowledge side of the work incidentally rather than in a thoroughly organized manner. Almost to a unit they can be said to subscribe to the dictum of one of their group who is reported as saying: "Oh, I take care of all matters of trade information when they arise. When a boy doesn't know the meaning of a tool or a machine part I tell him."

I consider it worth recording that my feeling regarding this point tallies with that of Mr. Richards, previously referred to, who reports that "The boys showed confidence, familiarity, and a fair degree of skill in dealing with the common machine operations but that their comprehension of machine work and of their own machine shop stopped pretty near the surface. They had apparently never been brought together for any instruction as to the mechanism of the various tools they operated from day to day or as to the nature of the materials used; neither had they been informed about other methods of machine work used in commercial shops or given any appreciation of the place the machine shop occupies in the industrial world." Then in another connection the same author refers to his findings in the forge shop as follows: "The results show that not much time has been given to bringing out the nature of the phenomena met with in the practice of the shop or to broadening the knowledge of the boys as to the iron working industry."

That there is developing a movement against the disorganized nature of this phase of shopwork is evidenced by the following resolutions submitted not long ago by a large group of manual training teachers.

"We would," they maintain, "save much of the limited time in the shop for the student, who, through the use of these references (texts, magazines, shop notes, etc.) is enabled to proceed without waiting for individual detailed direction from the teacher. By the use of the book the teacher is enabled to hold a class responsible for definite knowledge of principles and processes to a degree that is impossible when only verbal instructions have been given."

It need not be emphasized that lack of information militates directly against effective use of one's ability to meet new situations which, it will be recalled, is the acid test for all students eventually. Of course no teacher believes that a pupil thinks straight on a question when he does not possess the necessary information. Not that mere possession of the needed information qualifies him for worth while positions yet the manner in which teachers even of long experience, dis-

regard either one or both of these important factors, factors which inevitably must be yoked together if satisfactory results are to be obtained, is nothing short of appalling. To all who are so inclined Dr. Dewey's pertinent advice that "those who would succeed must learn to think *with* rather than merely *about* facts" will prove helpful.

Tests Always Imply Standards.

As has already been intimated, giving tests of any kind inevitably carries certain important implications with it, namely, (a) knowledge of the standards of accomplishment which prevail in the specific field must obtain; (b) the one who prepares the test must not only know what these standards are but must let them serve as his guide; (c) those who are to take the test must have been trained in such a way that they know what these standards are. Applied to the field of manual subjects this means that in order to pass tests which many be given, any one or all of the following conditions must prevail, dependent upon the nature of the test; (a) the candidate must possess a certain amount of knowledge or know a specificable number of facts; (b) the candidate must have ability to make use of these facts, to think with them, to make them serve toward the solution of his specific problem; (c) the candidate must also possess a more or less specificable amount of skill, i. e., ability to manipulate machinery, tools, materials, etc. in such a way that the desired product is turned out.

Let me put this same thought in other words. When a boy enters the contest for the high jump, or the broad jump, or the pole vault, he is up against what might literally be termed standard specifications. There is no question in his mind, if we assume that he has some experience in the particular event, as to what he must do. Here, at least, his objectives are entirely clear. What concerns him is how to manage himself so that he may attain his objectives, how to conserve his strength, how to put forth all his available energy at the time and place and in the manner necessary, how to gauge the starting or "get away" point, and so forth.

I do not desire to press this analogy too far, for I know full well that analogies are always dangerous. It would be easy to prove that the nature of the objectives in the two instances is very different, that, in fact, in the latter it is much more easily seen than is true where a certain quality of workmanship is the goal. The same would be true where any aspect of quality enters into the consideration. But even so, it cannot be denied that the points of similarity are numerous enough to make the analogy worth while. Definiteness as contrasted with vagueness is our objective, standard specifications rather than "just anything," situations which make known in no uncertain terms to contenders that they have succeeded or failed in their attempt. Surely we can derive something of value from this and other practical situations daily faced by our pupils. May it not be put this way: the nearer we come to removing all uncertainty regarding the standards to be attained in each of the three fields of manual work, i. e., knowledge, intelligence, and skill, the nearer, we shall come as teachers to attaining the standards that we should.

Some Sample Tests.

It is almost if not entirely obvious, at least to the careful reader that, regardless of the trade represented in the particular test, tests for skill always involve to a degree both the knowledge and intelligence type of test. At times this degree is large, at others small. It is also evident that in every instance a test which is strictly informational in character may be formulated. Finally though this in most cases is more difficult as well as less practicable, it is easily seen that the intelligence type of test may be constructed in such a way as to exclude entirely the skill, though not the informational type.

The foregoing facts suggest not only possible but feasible arrangements so far as the preparation and giving of tests is concerned. This I have mentioned elsewhere.[3] As I pointed out at that time, it is easily possible for teachers of manual subjects to organize and conduct their work so that tests emphasizing each of the distinct phases of the work may be given from time to time. Especially is this true, it was stated, of the knowledge or informational phase of the trade. It is not difficult to see that this is also true in another way of the intelligence phase, to illustrate: The planning of a job, i. e., properly estimating the amount and kind of material needed, also the tools and other equipment, etc. calls for intelligence of high order yet very often calls for little or no manual skill.

The same thought may be illustrated in a very practical manner by referring to the common practice of finding approximate answers to problems in mathematics, particularly arithmetic. Intelligence is brought into play though no manual activities take place. It is my feeling that if more of this type of work were done it would be to the advantage of both our pupils and our schools. There is nothing so much needed in the world as men and women who can and will plan effectively before starting to do the work at hand.

1. A. **Trade knowledge (electrical work):**
   1. Why is it necessary to keep dry cells in a dry, cool place?
   2. What is the effect upon the cell if the sealing compound on top becomes cracked?
   3. How may a wet cell be recharged?
   4. In what way should cells be connected in order to increase the voltage?
   5. Why is it important to scrape the ends of the wire clean when making a splice?
   6. Why should two wires never be fastened by means of one non-insulated staple?

   B. **Trade skill involving both trade and knowledge intelligence:**
   1. Install a two-wire return call system between two rooms.
   2. Install an open circuit burglar alarm in a room having a door and a two-sash window hung on cord and pulleys. The alarm must

[3] See Industrial Arts Magazine, October, 1919.

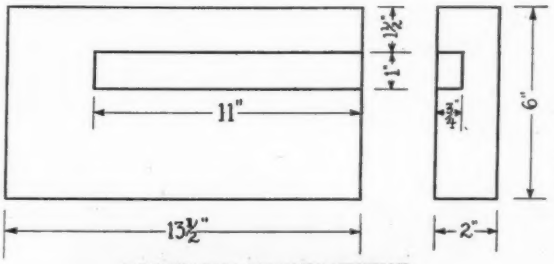
be constructed so that it operates continuously when the door or either sash is moved from a closed position.

Install three lines which may be controlled from four different points according to standard regulations for open work wiring.

2. A. **Trade knowledge (machine shop practice):**
   1. What kind of material should be used for making each of the following: a drill, a tap, a cone pulley, a line shaft?
   2. Why is it necessary to temper tools?
   3. Why should you run a machine rapidly when filing?
   4. Why does a shaft turn taper when the tail stock is off center?
   5. What is meant by the term, clearance, when referring to tools?
   6. Name three tools that may be used for finding the center of round stock?

   B. **Trade intelligence:**
   1. Why is there danger of spoiling the work if you set a round nose tool so that its nose points in the direction of the feed? How may this danger be obviated?
   2. What is the effect upon the clearance and upon the top slope of having the tool set, (1) above the center; (2) below the center?
   3. When turning a piece of work in the lathe, how much is the work decreased in diameter, assuming that the cross feed screw has a ⅛″ pitch, if you move the cross feed dial one division?
   4. If the cross feed on your lathe were to stop turning and the drive belt continue to run, how would you proceed to locate the trouble?

   C. **Trade skill involving, of course, both (A) and (B):**
   1. Set lathe and job for cutting an 8 pitch Acme thread. (The tool is to be ground and set in the job).
   2. Cut keyway as indicated in the accompanying drawing.



LAYOUT FOR CUTTING KEYWAY.

3. A. **Trade knowledge (printing):**
   1. Give the directions for making a careful lock-up.
   2. What is meant by interspacing? Why is it generally used?
   3. Into what two styles may all job composition be divided?
   4. What is the advantage of having your own stick?
   5. What effect has interspacing upon a word? When is this objectionable?

   B. **Trade skill, involving, of course, both trade knowledge and trade intelligence:**

Directions: Set up the following copy on a card 3½″ by 5½″ using your own judgment as to type, margins, general arrangement, etc.

Public Schools,
Cincinnati, Ohio

Mr. _____

It seems necessary for me to inform you that _____ _____came late to school this morning. This is the _____ time he has been tardy.

I am sure that you will cooperate with the school in training your boy to be punctual and to that end will sign and return this card.

The school hours for _____ are as follows: _____A. M. to _____M; and _____P. M. to_____P. M.

_____
Principal.

_____
Parent's Signature.

Note—Pupils are required to submit an order in full for all materials, apparatus, etc., before starting construction. No grade will be given unless the alarm works properly.

If the above tests have been happily chosen they serve to illustrate the possibilities in this field. It might be well to emphasize once more the desirability of singling out the informational features from time to time and testing on them alone. Two distinct advantages should result therefrom, namely, (a) keeping the pupil constantly alive to the need of specific facts, and (b) stimulating the teacher to organize the informational phase of the trade in such a way that his tests and reviews may be scientifically rather than haphazardly given. Fortunately a few texts are now coming from the press which will prove of considerable help in this direction. The average teacher will find, however, that despite the assistance afforded by helpful texts, unless extreme care is exercised, his fact material will not be carefully organized; that, in short, a *laissez faire* policy will prevail with the usual inevitable results. Would that all manual teachers could realize that they are guilty of rank injustice toward their pupils when they expect them to think straight on shop problems before they have seen to it that they possess the necessary facts to think with!

Should Commercial Standards Obtain?

It would be a mistake to conclude this discussion without referring at least briefly to the oft-discussed point of standards. Especially is this true in this instance for the reason that, as has already been strongly emphasized, our question in one inseparably related to standards of attainment. Quality and quantity of product have ever been, and will continue to be major factors in the production world. Therefore, all the more reason for finding out the bearing which such standards have upon every day school shop procedure.

The questions which at once worry the young teacher are: What quality of work shall I insist upon my pupils turning in? Shall I be satisfied with mediocre workmanship from my beginning pupils, or shall I insist upon just as good work from them as from older pupils? Am I ever justified in demanding first-class work from pupils? Which, if either, should be stressed first, quantity or quality? Would it be all right for me to insist upon a higher standard in the former than in the latter? Or should the reverse position be taken? Since these and other questions of similar import will not down, and since, too, they have a very vital relation to tests in shop subjects, answers to them will be attempted.

If now we examine thoroughly the question of whether young workmen can attain commercial standards especially as to quality, we discover some interesting and significant facts. Probably the most important of these is the fact that, with rare exceptions, the inexperienced worker finds it impossible to appreciate

the finer points in workmanship. How can we then justly ask him to produce high-class work? Psychologists tell us that not until he clarifies and reclarifies his vision many times by means of repeated efforts to attain will he be able even to understand what constitutes high-class workmanship. Does it not follow, therefore, that any and all attempts to secure a commerical standard of work from beginners is a serious mistake? They cannot attain until they know what to strive for and they cannot appreciate what to strive for except through repeated efforts to attain. Of course no one can say how early in his career as a tradesman any man will attain his majority, so to speak, or, in other words, be able to appreciate fully the finer points of his trade. His native capacity, his attitude toward life, and the quality of instruction given to him will inevitably enter in as the chief determinants. I repeat—for it is on this that the whole question hinges—that until one knows what fine workmanship is, he cannot exhibit it, and that he cannot possibly know what fine workmanship is until he has gained, through experience, an intimate acquaintance with such factors as accuracy, neatness, finish, etc.

The mistake of far too many teachers—I refer to the practice of not insisting upon good work from pupils because, as they say, a pupil cannot do a first-class job regardless of what takes place—however, must not be multiplied. Rather there must be increased acceptance and adoption of the doctrine of relative standards while the young worker is struggling to become proficient. By the term, relative standards, I mean what might be termed a sliding scale of values or standards, or one adapted to the developing abilities of the young aspirant. one which encourages continued efforts by means of merited rewards for work well done, for relative perfection attained.

What I have said regarding quality is true in principle regarding quantity. It is significant that the average mechanic, unless scientifically directed, cannot appreciably increase his ordinary working speed without materially decreasing the quality of workmanship. The same is true, only to a much greater degree, of the young mechanic who is not yet sure of nor precise in his movements. With him speed is invariably attained at the expense of quality, though this is far from saying that if poor quality may be put up with for a while it would not be better in the long run to insist upon more speed from the first than is usually done. There is, however, another element which enters here, especially in working with certain types of tools namely, that of danger.

It would seem from our analysis of the situation that insistence upon the attainment of commercial standards by beginners in manual work is the greatest kind of a mistake. Moreover, that it greatly increases the likelihood of bodily injury. As to whether arrival at the point where both quality of workmanship and speed are possessed may come about more quickly through sacrificing quality in favor of speed during the early stages rather than following the usual method it is probably useless to discuss since up to a certain point quality supercedes quantity in the commercial world. Practically speaking, then, the best that can be done with young workmen is to help them to appreciate the significance of commercial standards just as soon as possible, but not to expect them to attain such standards early in the game.

EXHIBIT OF BIRDHOUSES MADE IN THE SCHOOLS OF FORT DODGE, IOWA.

The above illustration represents a part of 94 birdhouses made in the Fort Dodge Schools under the direction of Mr. J. M. Bice, Grade Shop Instructor. They were made during the winter months of 1920-21 and were sold by the boys in the spring of the year at prices ranging from 15 cents to $4.00. The exhibit, which was made in a prominent store, attracted a great deal of attention on the part of the community.

THE PERGOLA AS IT APPEARS IN SUMMER.

The Pergola as a Community Project

Joseph C. Park, Director, Industrial Teacher Training Department, Oswego, New York, Normal School

THE newer developments of industrial education demand manual activities which provide project work involving many community occupations. The days of the "old type" manual training, where woodworking was the only line of manual activities and where isolated or non-related models were constructed in a shop, where the benches were lined up in uniform rows, are gone forever.

If the work in the seventh and eighth grades is to serve as a finding course in helping pupils to learn something about trades and occupations many activities should be provided in school shops—activities involving not only woodworking, but machine shop, sheet metal, electricity, pipe fitting, printing, and other community occupations. These various activities should be given without detracting from liberal education in any way. If rightly conducted by the project method these community occupations can be covered in a limited degree so they will help to give the pupils in these grades a general knowledge of some of the occupations. Thus by obtaining knowledge of materials, tools, and processes, by working on real jobs, industrial work very largely contributes to the liberal education of the pupils in these grades. H. G. Wells says, "I suppose that one could define education as the lifting of minds out of blind alleys." Industrial education is making a very large contribution to this aim of education. The socalled project method is a factor in the success of this work.

I have just finished reading Potterism. If you haven't read this new book, you must read it. On page 31 is this statement,—"Potterism will outlive all the reformers and idealists. If Potterism says we're going to have a war, we have it; if it says we're going to win a war, we shall win it."

Potterism says we are going to build a fine motor boat, and we build it and give it to the New York State Conservation Commission for use on the Hudson River. Potterism says we are going to build a system of playground apparatus that shall be recognized by Gustafson and handed on by him to Red Cross activities, and we build it. Potterism says we are going to build a pergola, and we build it. The industrial teacher who is not a Potterite and does not believe in Potterism will not get very far. I know an industrial teacher who was an anti-Potterite. Potterism said to him we are going to build a fine wall cabinet with glass doors to contain the loving cups won by athletics. This Anti-Potterite said he did not believe in exploiting the experiences of the boys and did not build the cabinet. The next year Potterism built the cabinet through a real Potterite and Potterism flourishes in that system now.

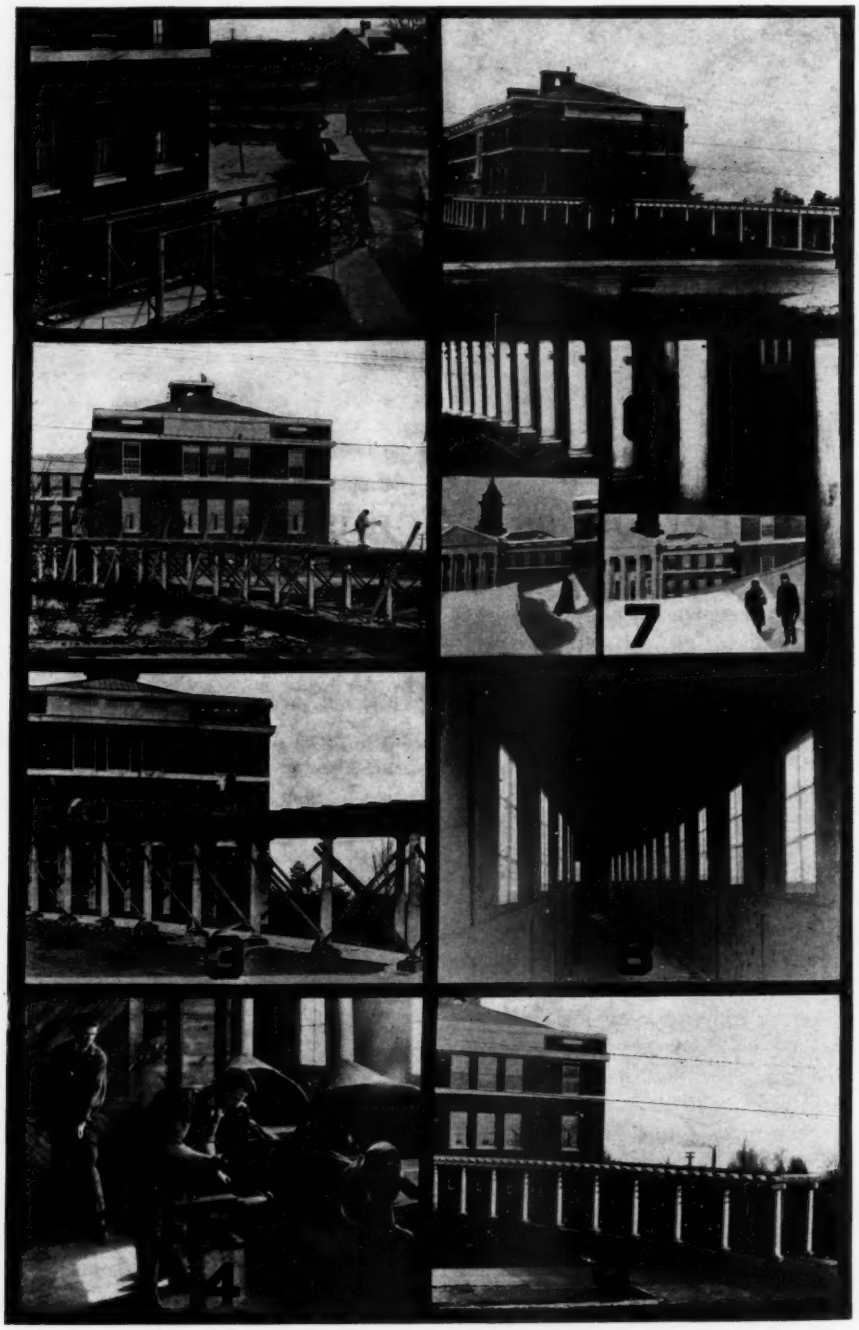
Potterism says we are going to build a Pergola and here is the story:

The pergola, or pergola-windshield, illustrated in the accompanying cuts was built by the "force of the school," as Mr. Anthony of the Fitchburg, Mass., Normal school would express it. What does Mr. Anthony mean by "the force of the school" on a school project of this kind? He means the *instructors* the *students,* and necessary outside hired help. And so in

putting through this project the "force of the school" was utilized.

According to the encyclopedia we find this definition: "Pergola (Lat. *pergula*, a projecting roof, shed, from *pergere*, to reach forward, project), a term adapted from the Italian for an arbour of trellis-work over which are trained creeping plants, vines, etc., and especially for trellis-work covering a path, walk, or balcony in a garden."

So in the construction of this pergola an effort was made to have the construction in keeping with classic traditions and, at the same time, to utilize the pergola for a windshield in winter by attaching temporary sides. A local architect was called into consulta-



THE PERGOLA UNDER CONSTRUCTION AND IN USE.
1, 2, 3—Laying the Roof. 4—Forging Anchor Irons. 5—A Section of the Pergola in Summer. 6—Detail of Pergola in Winter. 7—Reasons for Snow and Wind Shield. 8—Interior of the Pergola. 9—Detail of the Pergola in Winter.

tion for suggestions on the general lines of the structure and on some of the more important details. Classes in drawing made designs and details for cement walks, concrete abutments for columns, rafter ends, and electric lighting. One full-time mechanic was employed to help carry on the work and to act as assistant instructor when students were working on the job.

The pergola is 185 feet long, extending from one of the side entrances to the front walk and trolley line. Figures one, two and three show the students at work on various stages of the structure. There are 48 columns which support the roof. A seven eighths-inch anchor iron extends from the top of the plate through the column, and is anchored in the concrete base. A solid structure is required as there is a tremendous strain in winter when the sides are in place and especially when a ninety mile gale is blowing. Figure four shows the students at work forging anchor iron for the columns. Figure five illustrates the length, slope, and wind of the pergola to correspond with the driveway and grading. Figure six illustrates the concrete foundations for columns, also the concrete gutter to carry the water from the driveway. Figure seven is an illustration of snowdrifts extending to the top of the pergola-windshield, showing the need of this structure. Figure eight is an interior view. There is ample light in the daytime and at night it is lighted by electricity. Figure nine is an illustration of the sides in place ready for the storms of winter.

Vocational Guidance in High Schools

H. R. Mc Dougall, Director of Vocational Guidance, High School of Commerce, Omaha, Nebraska

IN making a proper approach to the problem of vocational guidance at the High School Commerce, Omaha, the need was felt for more definite information as to what other high schools were actually doing. Accordingly, a mimeographed questionnaire was sent out to all high schools doing anything in vocational guidance. The inquiry consisted of 37 questions covering the four general parts of the problem such as—vocational information counselling, placement, and employment supervision or followup work. It is hoped that the results of this survey may be of some assistance to those working on the problem, suggestive to those about to begin it and of interest to others.

Questionnaires were sent out to 290 high schools in 39 states. Of these 39 states 32 replied. The nine states of Louisiana, Mississippi, Alabama, North and South Carolina, Delaware, Utah and Nevada were listed as doing nothing in vocational guidance. The following states to whom one or more inquiries were sent failed to reply: Arkansas, North Dakota, Oregon, Virginia, Tennessee, West Virginia and Wyoming. One reply was received from each of the following: Arizona, Georgia, Florida, Kentucky, Maine, Montana, New Hampshire, New Mexico, Rhode Island, Texas and Vermont. Two returns came from each Colorado, Connecticut, Idaho, Iowa, New Jersey, and South Dakota. Three replies were received from each Indiana and Oklahoma. Four answers came from each Kansas, Michigan, and Missouri, five from Washington, six from Minnesota and seven from Wisconsin. Illinois led in the greatest number of replies with seventeen, Massachusets was second with fifteen, California third with twelve, Pennsylvania eleven and New York with nine.

To the 290 questionnaires sent out approximately one-half of the schools replied but only 130 of the returns were found to be of value for compiling purposes. Of the 32 states which replied approximately 50 per cent of the schools in each state made reply. While it is unfortunate that larger response could not have been returned, the results probably would have been changed only in volume. This article is based on the returns from 130 high schools which have vocational guidance as high school work.

Five kinds of high schools replied. Fifty three indicated that their curriculum was chiefly academic. Forty eight were designated as comprehensive or composite high schools, 40 as commercial, twenty as technical, two as purely trade and one polytechnic.

One hundred and sixteen schools were co-educational. Nine were purely boys' high schools and five girls' high schools. The average enrollment in the boys' high schools was 605 and in the girls' high schools 593. In all schools replying 1002 was the average enrollment for each. Vocational guidance is receiving the most attention in high schools whose enrollment is 500 or more.

Ninety high schools indicated their aims as college preparatory ,vocational, and general educational. Twenty-one indicated their aim as chiefly college preparatory, and 21 as strictly vocational. Vocational guidance has made a stand in the composite and academic high schools as well as in the purely vocational. This is significant.

The approximate percent of graduates entering institutions of higher learning in the 130 schools doing vocational guidance was 34.7 per cent, and 45 per cent of entrants dropped out before graduation. From some of the smaller schools the number dropping out was almost negligible while from some of the large city high schools from 80-90 per cent. In the latter instance this was partly due to a large number taking a two year course.

Special vocational training is offered in 97 of the 130 schools. Eighty-eight offer commercial and general business training with some instructions in the trades. Fifty four schools give trade training but not to the entire exclusion of the commercial subjects.

Fifty-four schools out of the 130 have available for use a scientific survey of local industries and occupations. This is a very important part of the problem in making a practical application of the school to local industries—to the end that both may be mutually benefited.

The methods of making the surveys were as follows: In 21 cases surveys were made by the city or state educational authorities. In 28 instances the surveys were made by some authorized official of the local board of education, by school questionnaires, or by personal visits on the part of the principal or director of vocational guidance. In six places industrial surveys were made by the local Chamber of Commerce, Consumers' League and women's clubs.

Forty-six school systems have prevocational direction or vocational guidance in the grades. This was confined to the seventh and eighth grades almost entirely. Only five schools report vocational direction in the grades as successful. Eighty-four schools do not have grade vocational direction in an organized way and the value of such when indicated was unsuccessful, doubtful or unknown.

Eighty-one schools made an organized attempt to discover vocational aptitudes through work in English. Thirty-five make no formal attempt or only in a desultory way. The remaining fourteen schools did not reply to this question.

Only 54 schools require or urge their teachers to act in the capacity of vocational counsellors. Ten schools reported that teachers were required to act as vocational guides but there was no indication that the word guide had a different interpretation than counsellor. Two schools required that teachers act as educational counsellors only. Two schools used the plan of having a committee of the faculty in charge of vocational counselling. Another attempted vocational counselling through close cooperation with the parent-teacher's association.

Thirty-four or slightly over one fourth of the schools give vocational civics or a course in "occupations" in a separate and distinct class as one of the subjects of the curriculum. However, fourteen schools combine vocational civics with either English or community civics. Eighty-two schools have no classroom instruction in occupations, classroom instruction in vocations has only just made its beginning.

Thirty schools offer vocational civics as classroom work or in connection with other subjects in the first or freshman year. Eighteen schools give vocational civics separate, or with other subjects in the second, third and fourth years—chiefly in the fourth.

Thirty-one schools use a book or a locally prepared pamphlet as a text in occupations. Gowin and Wheatley's "Occupations", while supposedly written for tenth grade boys, seems to have a clearly established lead over competing texts.

Thirty schools separate boys and girls in classes in vocational civics. One hundred schools do not separate the sexes or failed to indicate.

As to methods of instruction in vocational civics 44 require that students keep notebooks as classwork, 54 require readings and library work on "occupations" and in connection with English when vocational civics is given as a part of English work. Sixty-eight require reports on local industries and written reports on assigned topics from the library usually on vocations. Forty-eight require vocational essays often in this case with English. Seventy-five have excursions to local industries, although often not primarily as vocational trips. Twenty-one schools have addresses and talks by business men and women prominent in different lines of work. Three schools make use of a part-time employment scheme for purposes of a vocational try-out.

Fifty-one schools have a director or special teacher responsible for vocational guidance. In 62 schools this is handled partly or entirely by the principal. In 26 schools the deans of boys and girls handle vocational guidance at least partially. In six schools the heads of certain departments especially commercial and trades direct vocational guidance, and in two schools a faculty committee is responsible for this. In 56 schools teachers are either required or urged to assume vocational and educational direction for certain classes, groups and home rooms.

Forty-five schools report positive cooperation with parents in guidance, while 25 more modestly admit that there is cooperation only to "some extent" or in certain cases. Three schools undertake cooperation with parents through a parent-teachers' association, one by means of press publicity, one by home visiting and still another through the local trades council.

Eighty-six schools have employment or placement bureaus of their own and 43 carry on this important part of the problem by functioning partially through a central bureau usually under the direction of the board of education.

One hundred-and-five schools keep accurate scholarship records on file. Only 65 schools have the cumulative vocational and character estimates of teachers on report cards or on record for purposes of vocational counselling and placement. After placement only 51 schools indicated that records were kept up to date and others reported that records were kept up only to "some extent." Answers to this part of the problem were indefinite and unsatisfactory. Seven schools indicated that records were accurately kept for one year only and but one school kept such records for five years after placement. Two schools indicated that graduates

and former pupils made reports from time to time of their activities for record. One school does followup work for the purpose of keeping records, in cooperation with their alumni association.

Forty-three schools have employment supervision and followup work and 37 of these report that it is worth while, two that it is of doubtful value, and two that it is not of value.

Thirty-one schools report positive investigation of the successes, failures, incomes etc., of former students and graduates. Twenty-nine have investigation but not in any organized way. One school indicated lack of cooperation on the part of the pupils.

Only ten schools have jobs blue printed. One school has a card system and wage scale worked out. No other methods of job specification were mentioned or suggested.

Thirty-six schools make some use of mental tests in determining vocational aptitudes. Kinds of tests, and numbers of schools using same, were as follows: Twelve schools use the Otis Test, three the Binet-Simon, three the Terman Group test, three the National Intelligence, one the Trabue, one the Thorndyke, one Binet-Standard, one Modern Standard, one the Chicago Algebra, one the Navy, one Courtis, and one the Kelley Test for Mechanical Ability. Seven schools reported using tests but did not specify kinds.

As miscellaneous aids in determining vocational inclination four schools use moving pictures especially illustrating occupations in the basic industries. Two use stereoptican slides, one scrapbooks, and one instituted a vocational guidance week for arousing interest by such means as propaganda speakers and press publicity. One school has the services of a coordinator between the school and jobs. The individual in this case was an officer of the board of education. One school had a junior chamber of commerce, one a boys' engineering society and another gives a school course in local industries.

Some of the more important suggestions were: "Vocational guidance for seniors eliminates vocational counselling."

"Placement is a big feature of Vocational Guidance". "Mental tests for vocational purposes are not of value yet." "Close intimacy between the teacher and pupil is the best guidance." "The ideal is every teacher a vocational counsellor."

Organization and Teaching of Industrial Subjects in Part Time or Continuation Schools

R. H. Rogers, Albany, N. Y.

(Concluded from March)

VII. Suggestions on Methods of Instruction in Part-time Classes.

The analysis of the subject to be taught followed by the selection of units of instruction on the basis of the course objectives, facilities, time and abilities of students are fundamental to effective teaching. Any discussion of method must therefore consider the organization of content.

The work of the teacher may be divided into four blocks or periods:

1. The preparatory period
2. The presentation period
3. The classwork period
4. The dismissal period

The *preparatory period* is the time outside of regular class periods that teachers should give to organizing and preparing:

Instruction or job sheets

Special topics for class or group instruction

Individual assignments for students

Materials, equipment, illustrative material and supplies for class use.

One of the functions of a director or supervisor is to bring about results in terms of the above requisites.

The *presentation period* is the time in the regular school day devoted to the presentation to the class or groups of specially prepared material, either subject matter or trade practises. Two lines of approach may be utilized (1) the informational, (2) the developmental. The latter approach is the better as it provides opportunity for the largest possible amount of thinking and activity on the part of the student.

Teachers may employ four methods in connection with their instruction in industrial subjects: (1) demonstration, (2) illustrative, (3) lecture, (4) experimental. An analysis of the various methods indicates that the demonstration is most effective for all-round general purposes. The demonstration may be given in part, or in whole, by the teacher or by the students.

A director's or a supervisor's time may be well spent in part, in developing a special technique in conducting class, group or individual instruction. Problems of attention, native reactions, apperception, habit formation and self-activity should be constantly stressed.

Definiteness of purpose, summarizing and clinching of essential points in each day's work, and definite student assignments at all times, will do much to secure results in the part-time school shops.

The *classwork period* is that part of the class period in which the students devote their time to in-

dividual assignments. Teachers during this period must render such individual assistance as will enable the students to secure the most from their assignments. Instructors of shop subjects are commencing to realize that certain principles of teaching must be observed in class or group instruction but fail to carry over the same principles in connection with individual instruction. If principles are worth consideration in one case they are equally applicable in the other.

The *dismissal period* is that part of the class period given over to placing the shop in order preparatory to closing the classwork. Teachers have an opportunity here to develop standards of shop orderliness that will be very beneficial to students. This period should not be a haphazard picking up of materials, equipment etc., but a very carefully planned and organized part of the work of the class. Assigned duties to each student will usually result in the work being done rapidly and well.

Records of Student's Progress.

A student's progress record sheet should be a part of every shop teacher's equipment. Teachers should be in a position to tell at any time what jobs each student has completed and the quality of work being done. Many teachers prefer a large sheet that can be posted in the shop where students may see it daily.

This form of record may be worked out in numerous ways. The following is merely a suggestion.

The minimum requirements of the course are indicated under the heading of jobs. Blank spaces should be left frequently to permit of the adding of special jobs. The figure in each square represents the number of hours given to the job and the letter signifies the quality of work done. Teachers will discover that students will assist in keeping this record up to date and will be very much interested in their records.

An extension of the job column will permit the teacher to add the jobs of each trade in the group and will thus give a complete record of the student's activities in the trade group

VIII. Summary.

The material that has been presented under the title, Organization and Teaching of the Industrial Subjects in a Part-time or Continuation School may be summarized as follows:

1. The occupational facts pertaining to the community are absolutely essential for the intelligent development of a program of part-time education.

2. A general survey of the occupational facts discloses that the vast majority of part-time children between the ages of 14 and 16 years are employed in juvenile occupations and will change their jobs sometime after the 16th birthday.

3. The period immediately preceding the transition of these young people from juvenile to adult occupations should be one of intelligent and sympathetic vocational guidance.

4. Vocational guidance of the greatest benefit to the individual is that guidance given through a series of controlled practical experiences, on selected jobs, drawn from a wide range of occupational activities.

5. The organization of instructional material and the equipment of shops on the trade group basis affords the greatest possible opportunity to offer selected experience in a wide variety of occupations.

6. The organization of courses or instructional content should be around the practical jobs, the related technical information and the auxiliary information which includes the vocational guidance material.

7. Instruction organized on a trade group basis means a variety of occupational activities carried on within one shop and under the direction of one teacher.

8. A variety of occupational activities for part-time students in one shop necessitates making the instruction almost entirely individual in character.

9. Individual instruction in the composite shop requires the use of job instruction sheets to supplement the work of the teacher.

10. Instruction sheets should be so organized as to specify a definite job to be done with its accompanying technical, auxiliary and academic subject matter. Sheets should in all cases be prepared in a manner to call forth the greatest amount of individual effort on the part of the student.

11. The vocational activities in the part-time school may well be the core for all the instruction offered, in this way utilizing the phase of school work that is most interesting to vitalize the entire program.

STUDENTS' PROGRESS RECORD

NAMES OF STUDENTS	Jobs of the Course--Building Trades										
	Window Box	Benches	Kit Box	Window Frame	Garage			Book Shelves		Typewriter Tables	
1. Adams, Wm.	6 C										
2. Andrews, John		9 B									
3. Brown, Edw.	6 B		8 A								

FORM OF SUGGESTED PROGRESS CARD.

12. Trade preparatory work in the part-time school can only give at best, training in a limited number of fundamental jobs; trade extension work can offer the technical phases of the occupations that students do not secure on the job.

13. Short time contact in the part-time school requires a definite analysis and organization of teaching content; clear and well defined assignments to all students; shops and materials in readiness for work at all times; and at all times, consideration of the fundamental pedagogical principles in the individual or group instruction.

IX. SELECTED BIBLIOGRAPHY FOR THE TEACHING OF INDUSTRIAL SUBJECTS IN A PART-TIME SCHOOL.

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1. Syllabus of an Introductory Course on Part-time Education, University of California.
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3. Wisconsin State Board of Industrial Education, Bulletins, 10, 11, 13, 14, Monographs 1, 2, 4.
4. Federal Board for Vocational Education, Bulletin 52, Outline for the Machinist's Trade.

References on the Building Trades.

1. Carpentry—Griffith.
2. Carpentry—Townsend.
3. Constructive Carpentry—King.
4. Furniture Making—Griffith.
5. Cabinetmaking—Rudd.
6. The Modern Woodfinisher—Maire.
7. Problems of the Finishing Room—Schmidt.
8. House Decoration and Painting—Brown.
9. Essentials of Electricity and Magnetism—Jackson and Black.

References on the Metal Trades.

1. Elements of Machine Work—Smith.
2. Machine Shop Practise—Kaup.
3. Elementary Machine Shop Practice—Palmateer.
4. Sheetmetal Workers Manual—Broemel.
5. Sheetmetal Pattern Book—International Correspondence School.

References on Trade Mathematics.

1. Arithmetic for Carpenters and Builders—Dale.
2. Mathematics for Machinists—Burnham.
3. Shop Mechanics and Mathematics—Johnson.
4. Essentials of Electricity—Timbie.
5. Practical Mathematics—Hobbs, Waite, Schroeter.

References on Trade Drafting.

1. Engineering Drawing—French.
2. Mechanical Drawing for High Schools—French and Svensen.
3. Mechanical Drawing Problems—Berg and Kronquist.
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2. Hygiene for the Worker—Tolman.
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2. Wood and Forest. Noyes.
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2. Occupations—Gowin and Wheatley.
3. Federal Board for Vocational Education—Opportunity Monographs.
4. Vocational Guidance—Brewer.

References on Methods of Teaching.

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2. Teaching Manual Training and Industrial Arts—Griffith.

Reproducing Antique Furniture in the Schools

Herman Hjorth, Director of Technical Work, San Juan, Porto Rico

Article Two — Tables

THE study of antique furniture not only develops a technical knowledge of sound construction and an appreciation of beautiful design and proportion but also gives the student a certain historical background and perspective. Such study will, therefore, undoubtedly prove a valuable supplement to the regular course in history, especially American and English history. It is not merely a record of historical facts and events, but rather a consideration of the causes underlying and produced by such events. Consequently it is a more intimate history, in that it permits us glimpses of the life and customs of the times and shows us how economic conditions and social usage have set their stamp on the furniture of our ancestors.

TABLE (FIG. 7).
Courtesy of Mrs. Wm. Korber, San Juan, P. R.

Some of the oldest tables that have survived merely consisted of oak planks supported on wooden horses. A little later appeared the socalled "refectory" tables, which were long and narrow, even reaching the astounding length of thirty feet. The legs were connected by stretchers, on which to rest the feet and keep them off the floor, usually covered with not too clean rush or straw. Sometimes the legs were also provided with iron rings, to which dogs were tied, while their masters indulged in the pleasures of the table. Such rings are called "dog rings."

As space became more valuable and taste more refined, extension and gate-leg tables were invented, and

as commerce grew after the great discoveries, mahogany, satinwood, and other rare woods were brought to Europe and became the fashion, largely displacing the native oak and walnut as cabinet woods. Sir Walter Raleigh, the famous admiral and courtier, who spread his coat over the mud, so that his queen might walk dry-shod, is credited with bringing the first mahogany to England in 1597. Sir Walter had just returned from a voyage to the Spanish Main and Queen Elizabeth had honored him by visiting his ship. While looking the ship over she admired the beautiful wood with which the deck had been repaired. Sir Walter informed her that it was called mahogany, and, gallant courtier as he was, later had the ship's carpenter rip out the planks and make a table of them, which he presented to the queen. Thus mahogany, the most beautiful and important cabinet wood, the wood of which the best examples of the cabinet-maker's art are made, came into vogue through the whim of a queen.

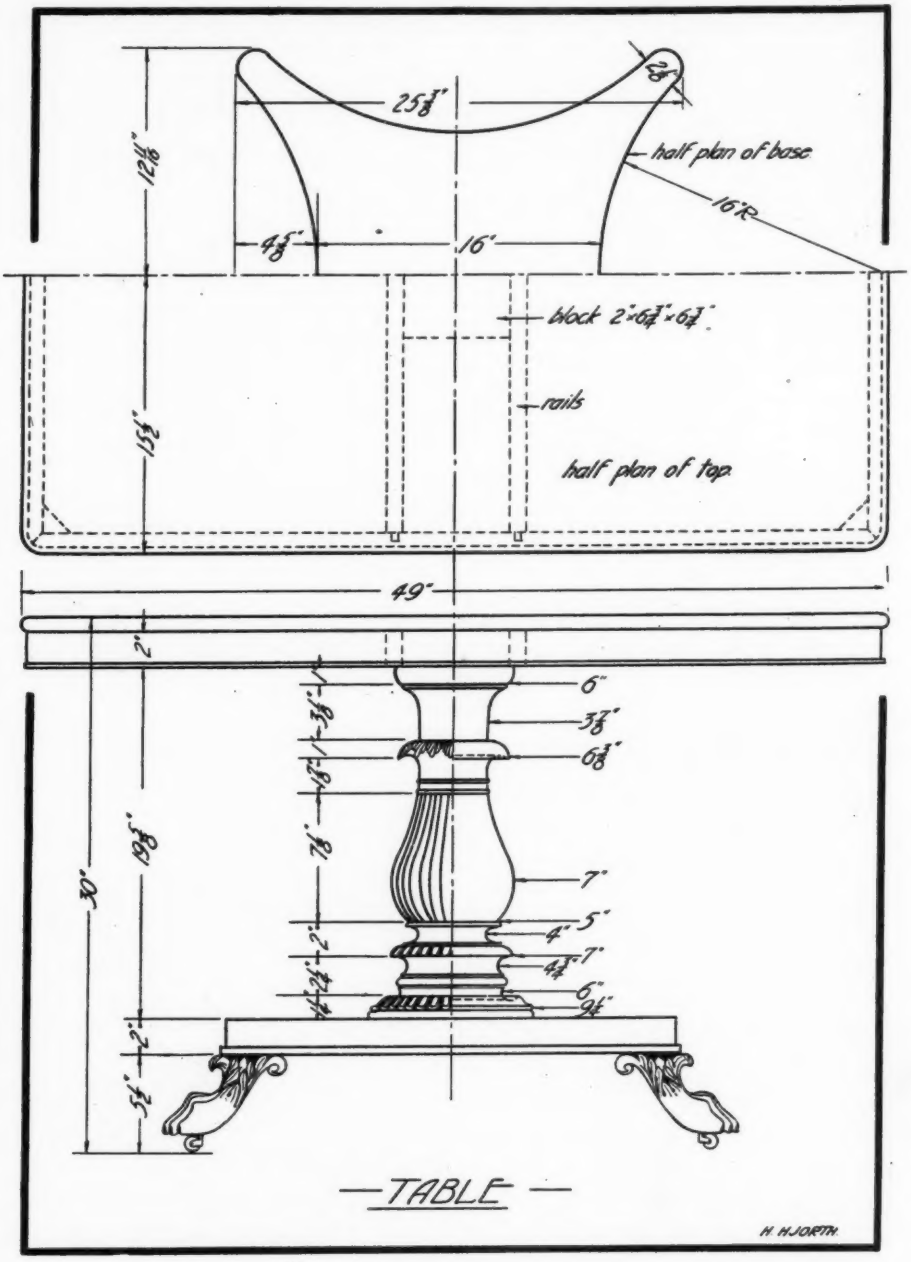


FIG. 7.

The tables described below, though of a much later date, are all made of mahogany. Figure 7 is a beautiful example of the American Empire Period. With ex-

ception of the clay feet it presents no particular difficulties of construction. The base may be made as described in the January, 1922 issue of the MAGAZINE.[1] The column may be turned in one piece with exception of the part, 9¼″ in diameter, which is best turned separately on a face plate. A wrought iron rod as shown on the detail sheet passes through the center of the base and column and screws into an iron plate fastened to the underside of the block 2″x6¾″x6¾″. This block is held firmly by the two rails mortised into the apron of the table. The hole for the iron rod may be bored with a ⅝″ auger bit held in an extension bit holder after the column has been turned. But as it is difficult to bore the hole straight it may be better to glue up the column of two pieces 3¾″x7½″, cut a groove in

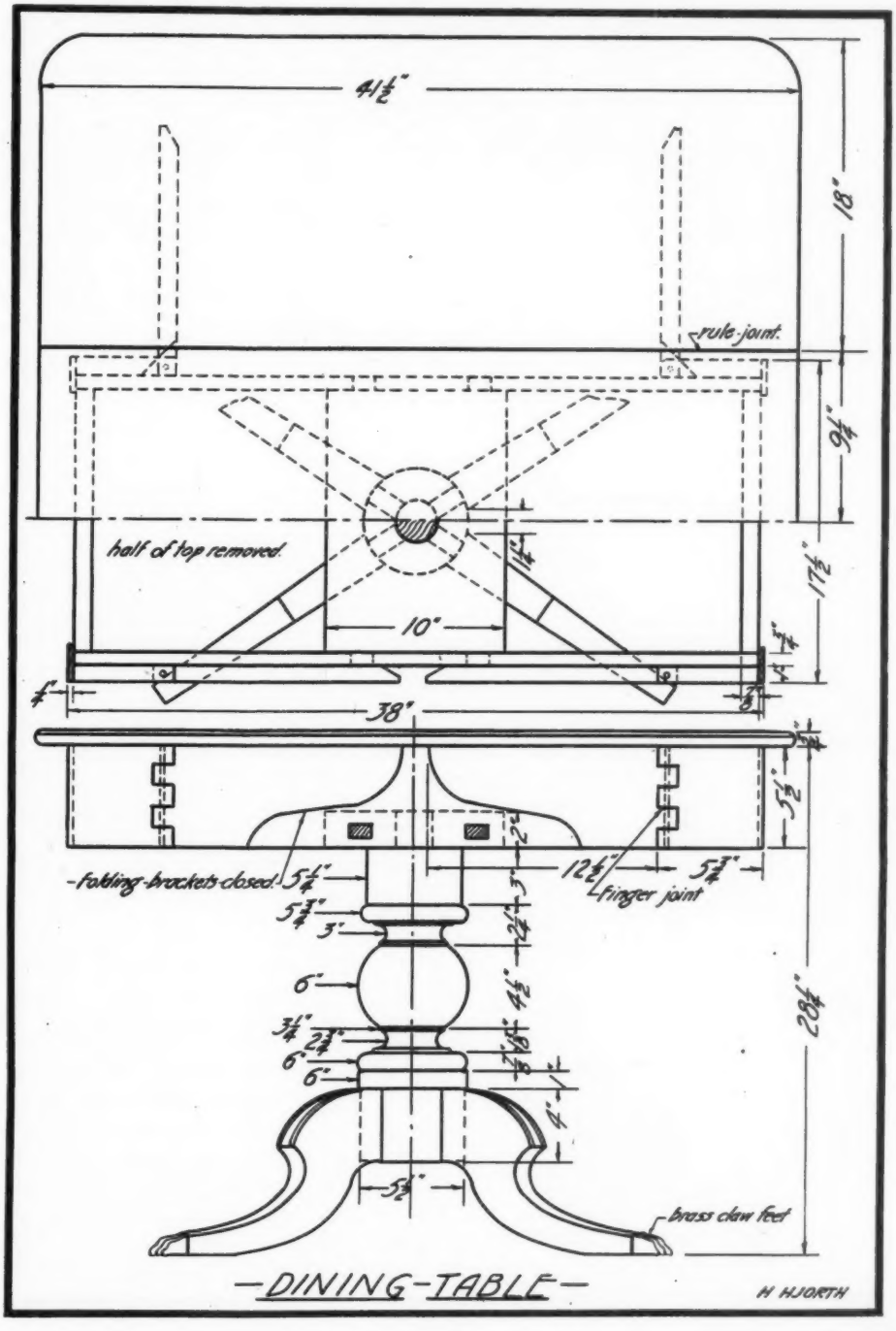


FIG. 8.

[1]See Card Table No. 3, January, 1922, Industrial-Arts Magazine, p. 15.

the center of each piece, 5/8" wide by 5/16" deep, and then glue them securely together, thus forming a square opening through the center 5/8"x5/8". To be on the safe side while turning this column, it is better to cut the pieces a little longer than necessary and bolt the projecting ends as explained in the issue for March 1921.[2] The column may be carved or left plain. Composition ornament may also be applied and can be obtained from Jacobsen & Company, 241 East 44th Street, New York City. This composition can be colored exactly to match the wood and is so well made that it defies detection.

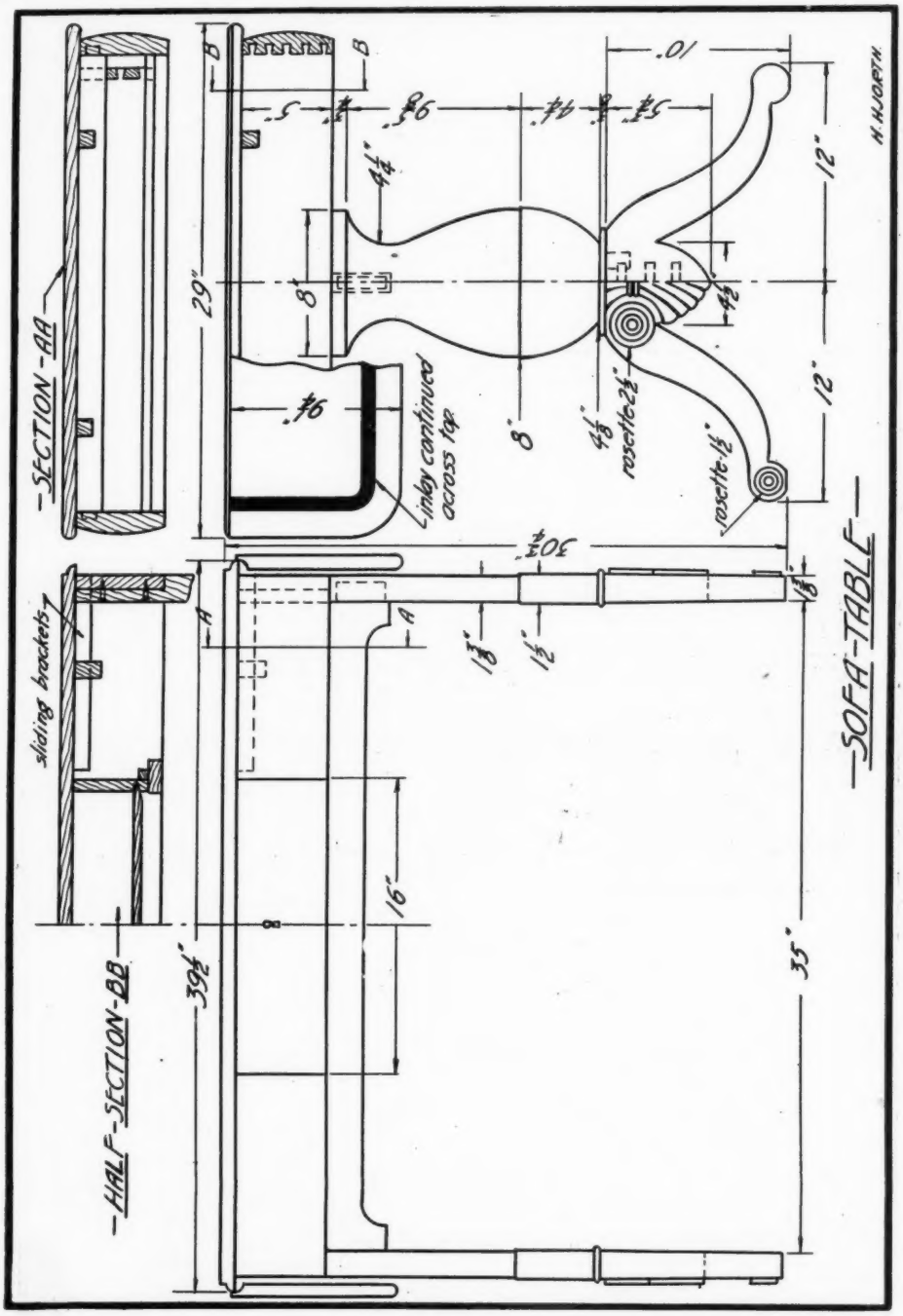


FIG. 9.

The Dining Table, Figure 8, also belongs to the American Empire period. The box forming the apron of the table should be dovetailed together, and the block to which the column is secured at the same time mortised into the two longest sides. The finger joint,

[2]See March, 1921, Magazine, p. 113.

also shown on the detail sheet, is then glued to the apron as shown in the drawing and the end wood concealed by the four ¼″ strips glued on as indicated. The construction of a finger joint was explained in the February issue of the Magazine.[3]

The top is composed of three parts, the middle part, screwed to the apron and the two other parts forming the leaves, which when in use are supported by the folding brackets of the finger joints. These leaves are hinged to the fixed middle section by means of the so-called "rule joint." Let it be said to begin with that a rule joint is not easy to make, and that it requires the utmost care and accuracy on the part of the operator. To one who has not made it before it is strongly recommended to try it first on a piece of waste lumber. After the pieces to be hinged have been planed to the same thickness and the right kind of hinges procured, set the marking gauge to the center of the knuckle of the hinge and gauge a line on the ends of both boards from the underside of the boards. On the board to be fixed to the apron set one leg of the compass on this line and adjust the other to a point about

DINING TABLE (FIG. 8).
Courtesy of Mrs. A. G. Wolf, San Juan, P. R.

3/16″ below the surface of the board. With the center in the gauge line describe a semicircle as shown. With the same radius describe a semicircle on the board to form the leaf, with the center in the gauge line, but at the edge of the board so that the fixed board forms the round and the leaf the hollow section of the joint. On the fixed board remove the wood down to the top of the circle (3/16″) with a rabbet plane, then plane the round and hollow on the edges of both boards with molding planes. It is recommended to use templates during the planing process. The hinges are fastened the reverse of the usual way, so that the knuckles point upwards. They must be let into the wood until they are flush. A deeper space must be cut for the knuckles until the center of the pin will coincide with the center of the semicircle. Care must be taken not to chisel through on the edge of the fixed piece, so that the hinge will be visible when the leaf is hanging down. The hinges should not be spaced too far apart.

[3]See February, 1922, Magazine, p. 69.

FRENCH EMPIRE TABLE (FIG. 9).

A simpler way of hinging the leaves is shown in the drawing of the French Empire Table, Figure 9. This method is just as strong, but does not present as finished and neat-looking an appearance as the rule joint. The leaves on this table are supported by sliding brackets, which fit into slots cut in the apron, and are supported on the other end by a rail mortised into the apron. (See drawing Figure. 10.) The octagonal column may be fastened to the top in a similar manner as described above for table, Figure 7. The column is built up of four wide pieces and four narrow ones. All these pieces are straight on the inside as shown in the detail drawing. Full-size drawings of the top and bottom sections should first be made on boards of sufficient size. The eight boards are then laid out and cut on the bandsaw as indicated on the detail sheet. The angle to which the edges are to be cut is taken from the full-size drawing and set off by means of a sliding T. bevel. These angles or bevels are then cut on a circular saw equipped with a tilting table, after which they are planed by hand, or on a jointer. Cutting the bevels will automatically reduce the boards to the desired width on the end which is to be the top of the column. The eight boards are now fitted together and any irregularity in the angles corrected with a hand plane. The column is glued, and clamped by means of

SOFA TABLE FIG. 10).

a strong cord twisted tightly around it at the base, top and center. When dry, it is smoothed with a circular plane, scraped and sandpapered. The concave cut at its base may now be chiseled out or planed with a half round molding pane. The wider piece, 2⅛" thick, resting directly on the base, is better made from a piece of molding shaped to the design. The claws may be of wood or metal or left out entirely. P. E. Guerin, Jane Street No. 21, New York City, can furnish metal claw feet.

The Sofa Table, Figure 10, socalled because it is intended to be placed in front of a sofa, is quite simple in construction. The top has two drop leaves hinged by means of the rule joint and supported by sliding brackets as explained above. The drawer is fully explained by the drawings on the detail sheet. Attention is called to the dovetailing of the rear corners, instead of the common dado construction, which is not so strong. The bottom should be glued up, so that the grain always runs across the drawer, that is from side

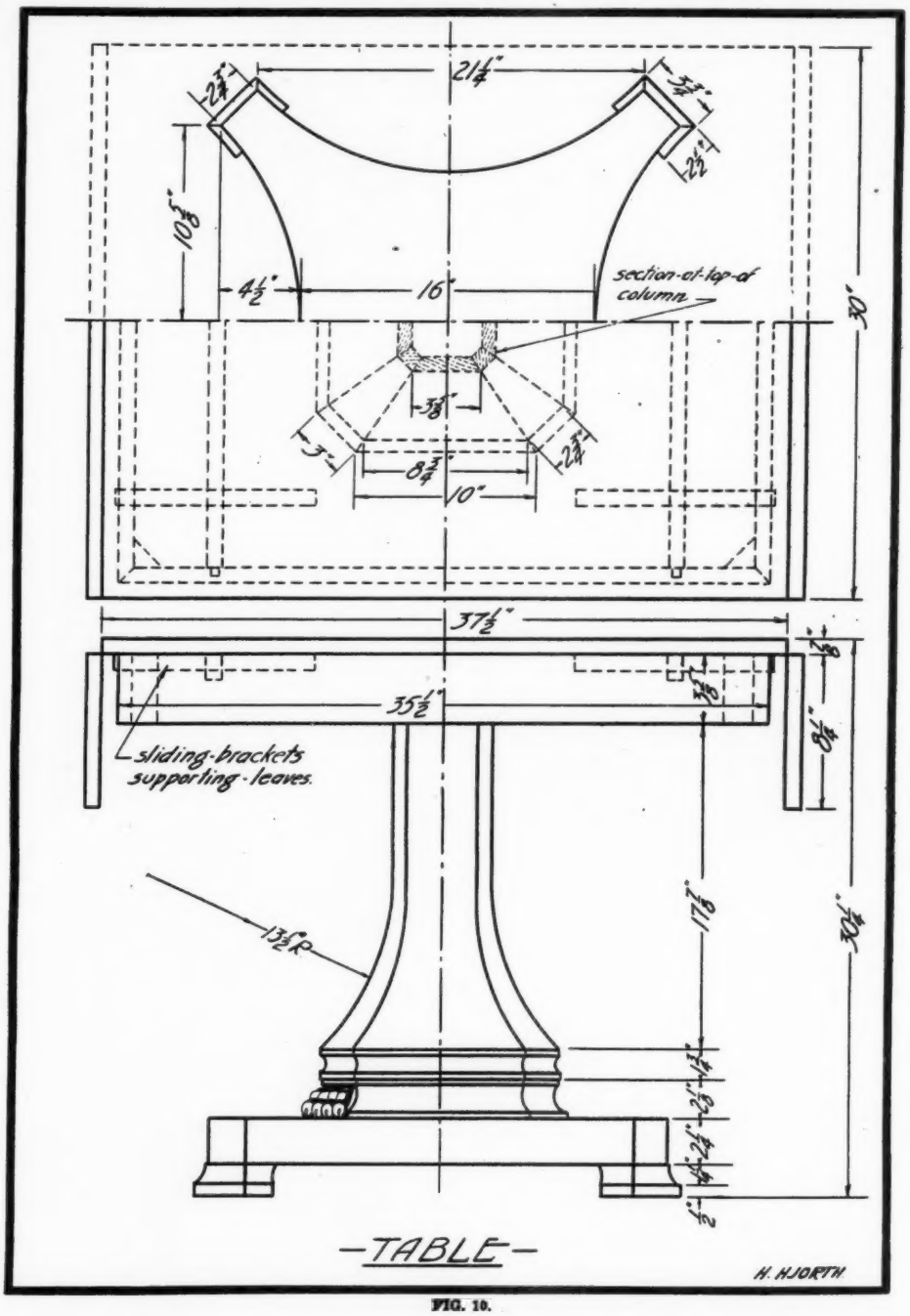


FIG. 10.

to side instead of from front to back. This is done so as to take care of shrinkage, hence the small projection beyond the back. If made the wrong way, that is with the grain running from front to back, openings would be liable to appear at the sides, as wood always shrinks across the grain, but very little along the grain. As the novice often finds it difficult to lay out dovetails, so that they have the right angle and proportion, the method shown on the detail sheet is offered.

The legs are laid out as shown on the detail drawing and cut on the band saw. The two halves are then fitted and doveled together, and the upright joined to them with a double mortise and tenon joint. The added thickness (1/8") on the lower part of the upright is obtained by gluing on a piece of 1/16" veneer on all sides. The rosettes and the carving, which is very simple, are glued on later.

(To be continued).

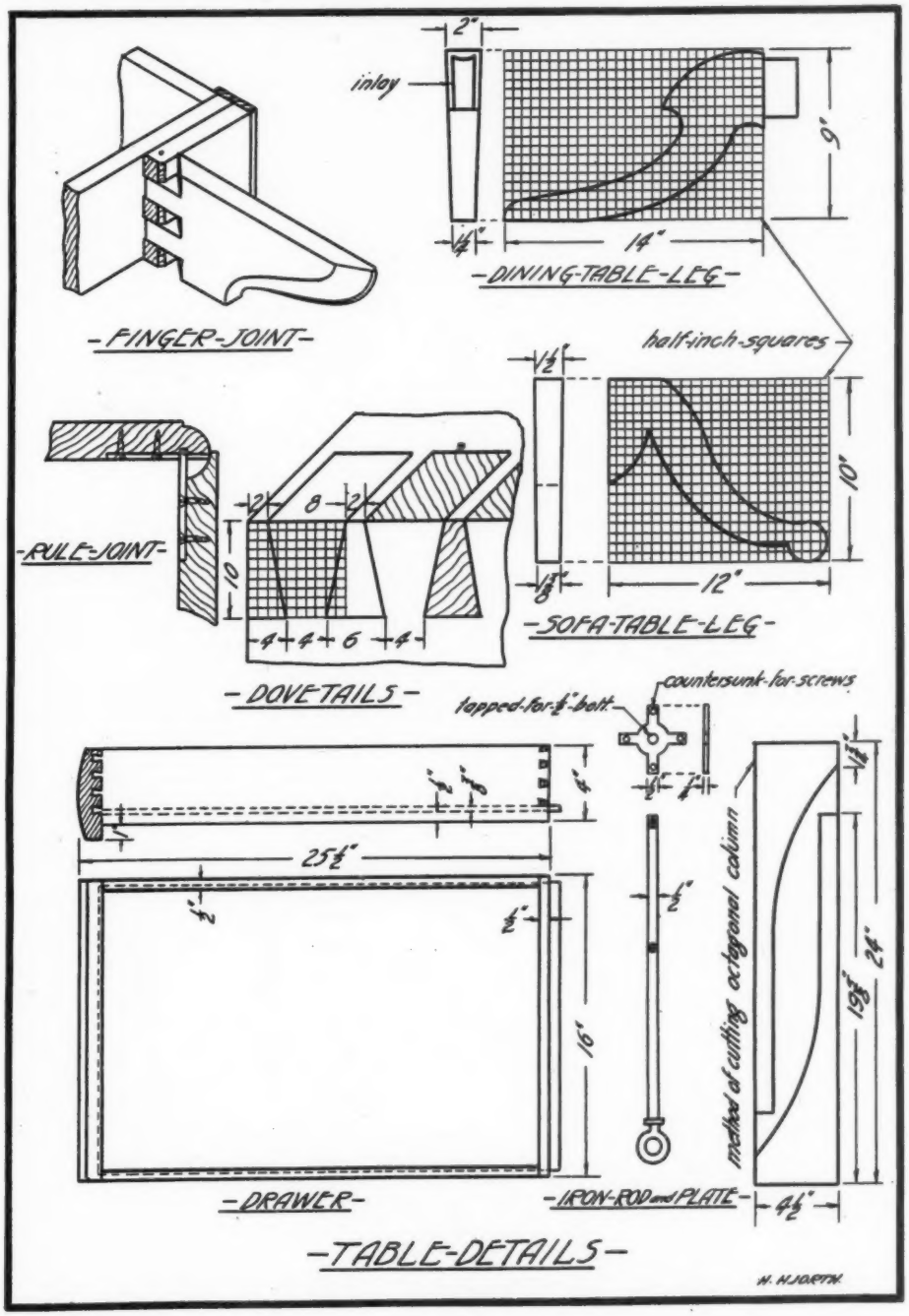


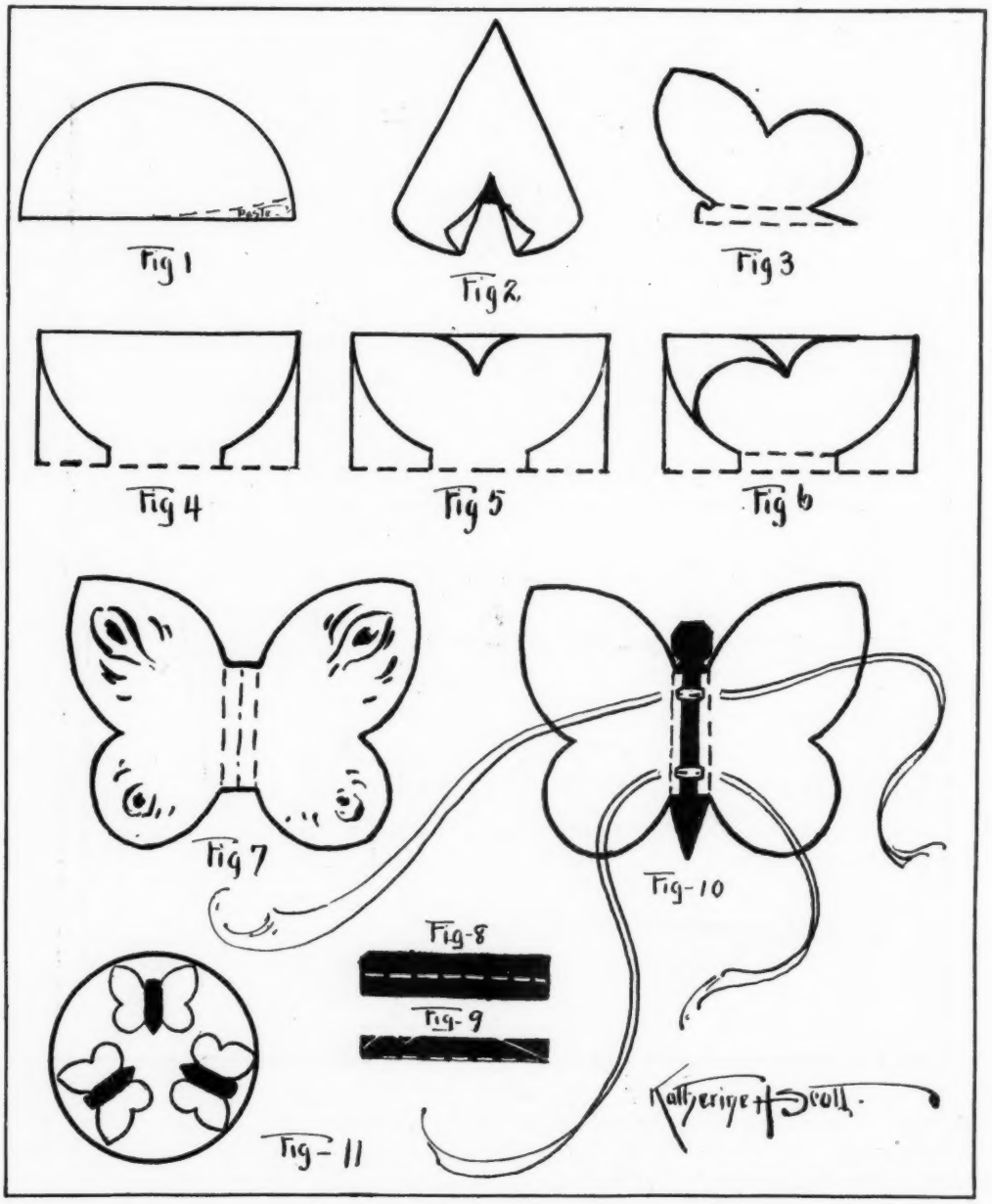
FIG. 11.

Color Problems for Primary Grades

Katherine H. Scott, Normal University, Normal, Ill.

FOR the benefit of teachers who are struggling to vitalize color in the child's mind, I have arranged a little course of color theory for the primary grades, which I have found very satisfactory in teaching the various steps to little children.

A child lives in the land of "make believe" in the early part of its life and I have found that it is much easier for children to understand a problem if presented by means of a story. So for the primary grades I have planned a few problems combined with simple fairy stories which the tiny folk delight in, teaching them not only the color charts as they come in order according to the grade, but simple designs and construction as well.



FIGS. 1-11.

Story Problem No. 1.
The Color Fairies.

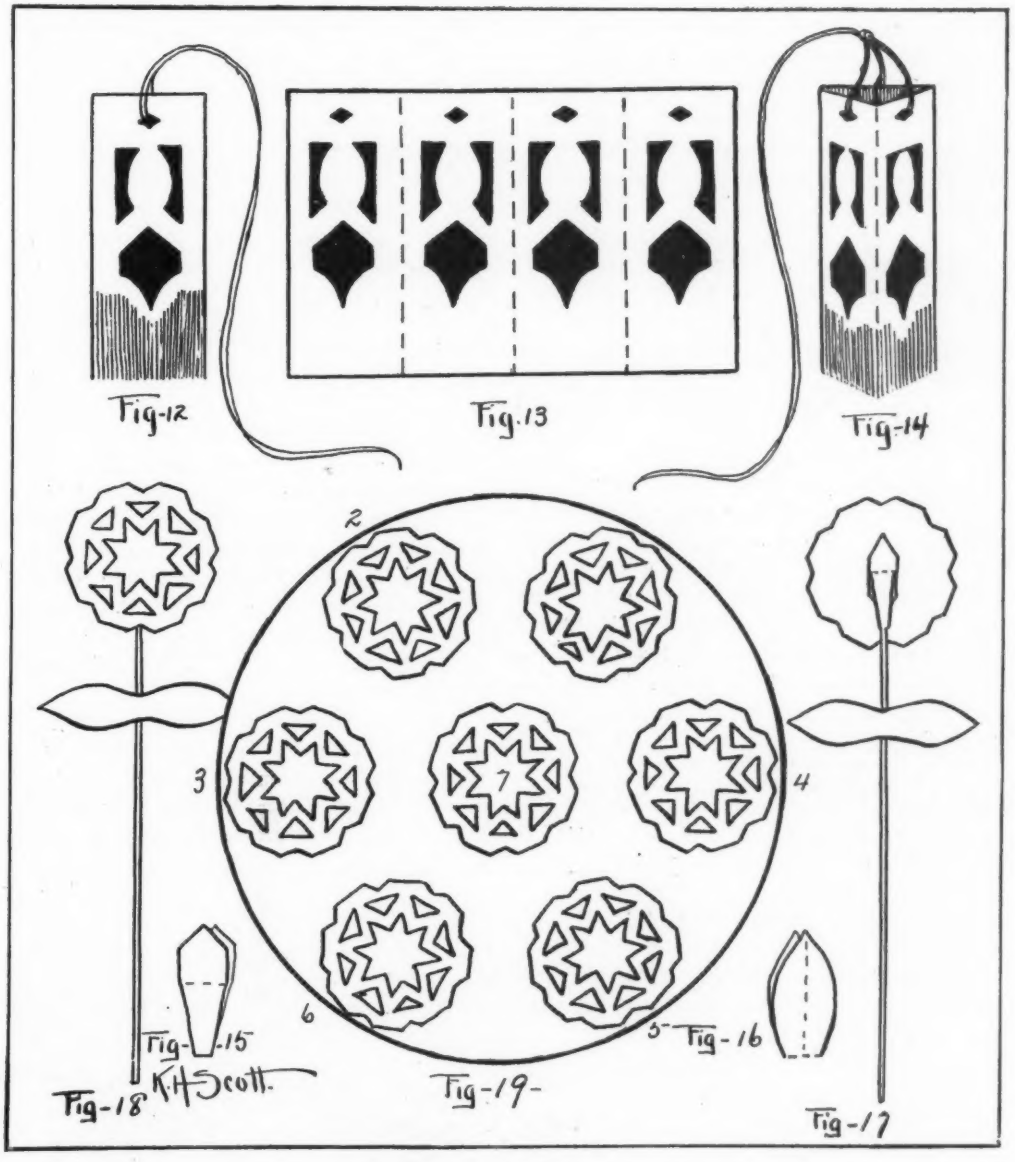
Once upon a time there were three little color fairies who lived in a round, white tent.

The youngest fairy wore a yellow dandelion dress which shone like a bright-star. The sister fairy wore a warm red dress made from rose-petals and the big brother had a cool suit of blue. The baby slept in a cradle swing of cobwebs hung in the top of the tent and the sister and brother staid near the door on the ground where they kept watch, till the big red sun dropped to sleep in the western sky.

Shall we make the fairy tent?

On a sheet of white drawing paper 9x12″, describe a circle with a radius of 4½″. Divide the circle into halves and cut apart. Give each child half of the paper circle and show the children how to roll the paper into a cone, and how to paste the edges together to keep the shape of the tent. Draw a smaller circle on white paper using the opening at the bottom of the cone to trace around. Divide the smaller circle into thirds. Cut three strips of paper ½x1½″; fold each strip on its short axis bringing the long ends together. Paste one-half of each strip to the inside of each third division of the cone leaving the other end of the strip free. Cut a straight line on one side of the cone between the pasted strips as in Fig. 2, and turn back the corners for the door of the tent.

To make the fairies, give the children three pieces of white drawing paper 4½x6″. Tone one piece of paper normal yellow, one normal blue, and the other normal red, using wax crayons for this process.



FIGS. 12-19.
1—Yellow. 2—Orange. 3—Red. 4—Green. 5—Blue. 6—Violet. 7—Neutral Gray.

When the paper is toned sufficiently, fold it on its short diameter, crease and cut or tear in two. Fold one of these pieces on its long diameter with the color inside and cut a butterfly shape with long straight tail. Fig. 3. Fold back the wings and paste body to the floor of the tent; one butterfly, or fairy, to each third of the small white circle to be used for the floor of the tent. Place the tent over the color fairies and paste the extra ends of strips to the underside of the floor. Look through the door of the tent; there are the tiny color fairies safely hidden inside.

Story Problem No. 2.
Fairy Lights.

At night the Color Fairies crept out of their tent and flew away. They carried tiny lanterns to match the colors they wore and wherever the light from these little lamps fell, tiny fairy flowers sprang up. Sometimes the light from the sister fairy's red lantern fell where the yellow baby fairy stooped to pick an orange flower and often little green blades of grass or delicate ferns sprang up to greet the yellow and blue fairies; or the red and blue fairies helped a little violet to blossom by the light of their lanterns.

We will make the fairy lanterns and then we will cut the fairy flowers.

Fairy Lanterns.

Cut a piece of thin red, blue or yellow paper 2½x4″. Use the primary colors. Fold each piece of paper on its short diameter and with out changing the position of the paper fold it again, and a third time. On the last fold cut good sized openings as in Fig. 13 and cut some fine fringe on one end; Fig. 12, open paper, Fig. 13, and paste one end panel over the other end panel making a tiny three-sided lantern. Thread strings through each little hole at the upper end and tie threads together, Fig. 14.

Story Problem No. 3.
Fairy Flowers.

Fold and cut circles of the normal colors and neutral gray from poster paper, the circles to be 1¼″ in diameter. Cut circles of thin white paper of the same dimension modifying the edges of the circumference while the paper is folded. Modify or cut into the sides and the center of the white paper before unfolding it. Open the circle and paste it onto the colored disc trimming the edges of the colored circle to correspond with the edge of the white shape. On the back of the colored circle, paste two small pieces of green construction paper, Fig. 15, leaving a little space between the pieces into which a piece of reed is placed and pasted, as in Fig. 17, to make the flower cup and stem. Cut two pieces of green construction paper 1″x3″; fold on the short diameters then on the long diameters, keeping one piece inside of the other, and cut a leaf shape like Fig. 16. Paste the two leaf shapes together with the reed stem of the flower passing through the center, Fig. 17. At Fig. 18 you will see the fairy flower finished.

Cut a circle of white paper and paste the fairy flowers of the normal colors and neutral gray in their respective places on the circle, fastening each stem with a green flower cup like the one used on the back of the flowers. The stems must be shortened to make the flower stand in an upright position, but for decorative purposes may be left long. Fig. 19 shows the arrangement of colors and Fig. 20 the flowers as they grow in the fairy garden.

Story Problem No. 4.
Fairy Wings.

Fairy wings may be made for boys and girls as well as for the fairies. This is the way to make them:

You will need one sheet of cream manila paper 6x9″ and one sheet of cream manila paper 9x12″; colored construction paper, normal colors; two sheets of the same tone to a child; the sheets of paper to be 9x12″. One piece of manila paper 2x7½″, one piece of black construction paper 2x7½″, one piece of paste board 2x7½″. Two yards of cotton tape, ribbon or cord, dyed to match the tone of the paper to be used: scraps of colored paper of normal tones, black and white; paste, scissors and a well sharpened pencil.

Fold a small sheet of manila paper on its short diameter and on the folded edge again fold the paper over about ½″. Cut the shape of a bowl cutting from the double fold on both ends of the paper. Fig. 4.

Turn the shape upside down and cut a nick in the center of the straight-edge of the bowl, Fig. 5. Turn the bowl shape to an upright position and cut away one side with a curved cut as in Fig. 6. Open the paper and we have a butterfly.

Let the children practice cutting these shapes on a small scale till they can master doing it, then give them a large sheet of manila paper to cut for a final pattern. When satisfactory results are obtained, fasten two sheets of colored construction paper and the butterfly

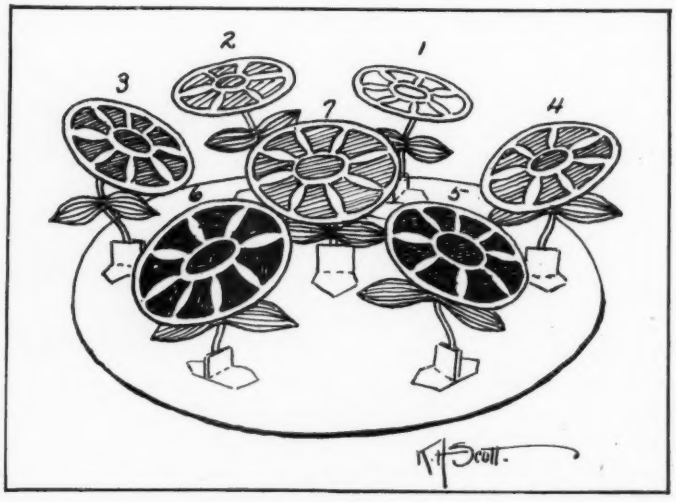


FIG. 20.
1—Yellow. 2—Orange. 3—Red. 4—Green. 5—Blue. 6—Violet. 7—Neutral Gray.

pattern together with margin clips and let the children draw around the pattern, folding the lower edge of the bowl shape over the edge of a ruler and creasing the paper.

Take a strip of black paper 2x7½″, fold on its long diameter, Figs. 8 and 9. On one end cut off the open corner on a short miter, and on the other open end make a long straight cut, Fig. 9. This, when unfolded makes the body of the butterfly. Paste this black paper shape to a piece of paste board cut the same dimensions and the teacher will trim off the corners with the paper cutter.

Through paper cutting make a variety of shapes from colored paper using a complementary color scheme or the neutrals and arrange on both sides of the wings for spots. Paste the flaps of the wings on the back of the body leaving the black shape for the outside, Fig. 10. Fold the wings against the body of the butterfly, one at a time, and punch a hole through the body and wings about one third of the distance from the end of the butterfly's head and extreme end of the tail. Thread a string, ribbon or tape through these holes from outside of the wings up over the body on the inside, down through the second wing and outside of it.

Place the wings on a child's back and bring strings to the front of the child's body crossing and tying in diagonal lines.

The wings may be worn by the children at recess or when not at school and will give the little folks much pleasure.

Easter Cards

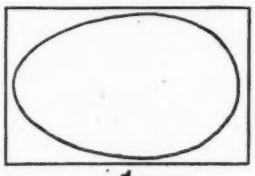
Miss S. E. E. Hammond, Springfield, Mass.

Card No. 1.

Material.

1 pc. light gray paper 4½″x12″.
1 pc. pink paper 2″x3″.
2 pc. pink paper 1″x1½″.
2 pc. green paper 1″x1½″.
1 pc. brown paper 3″x4½″.

Fold light gray paper 4½″x12″ on short diameter. Fold one 4½″edge to fold. Repeat with opposite 4½″ edge. From pink paper 2″x3″ cut one egg shape. Illus. 1. Paste egg on one 3″x4½″ oblong of folder allowing part of egg to extend over edge. See picture.



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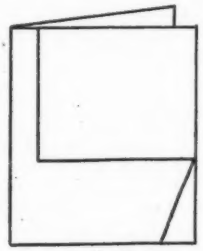


-1A-

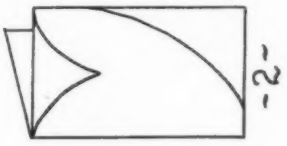
In like manner cut egg shapes from pink and green papers 1″x1½″. Fold brown paper 3″x4½″ on short diameter. Cut basket. Illus. 1A. Apply paste to basket at edges of bottom sides, and top of handle. Paste inside folder. Apply a little paste to pink and green eggs and arrange in basket.

Card No. 2.

Material.

1 pc. light green paper 3½″x6″.
1 pc. dark green paper a little larger than 3½″x6″.
1 pc. dark green paper 2½″x4″.
1 pc. red paper 1½″x1½″.

From dark green paper 2½″x4″ cut strip from 4″ edge not quite ¼″ wide. From remaining piece cut two tulip leaves. See picture. Fold red paper 1½″x-1½″. Cut tulip. Illus. 2. Arrange and paste stem, flower and leaves on light green paper 3¼″x6″. Mount on submount of dark green paper.



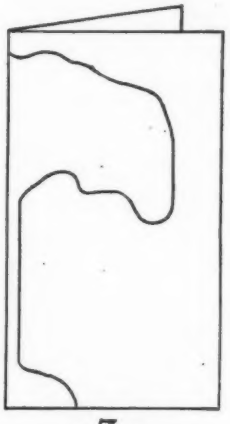
-2-

Card No. 3.

Material.

1 pc. light brown paper 5″x7″.
1 pc. dark green paper 5½″x7¼″.
1 pc. dark green paper 4½″x5″.
1 pc. white paper 2¼″x6″.

Fold dark green paper 4½″x5″ on short diameter. Cut tree. Illus. 3. Paste tree on light brown paper,



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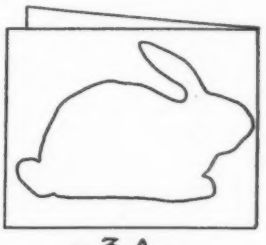


-3A-

5″x7″ with lower edge of trunk about ½″ from 7″ edge of paper. Fold white paper 2¼″x6″ on short diameter. Cut rabbits. Illus. 3A. Paste rabbits at each side of tree trunk. See picture.

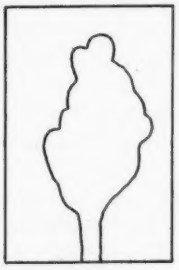
Card No. 4.

Material.

1 pc. white paper 4½″x6″.
1 pc. dark violet paper 1″x 2½″.
1 pc. light violet paper 1½″x2″.
1 pc. light green paper 1″x4″.

-4-

-4A-



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-7A-

-8-

-8A-

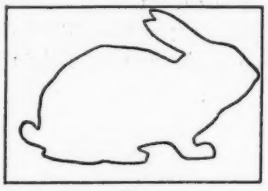
Fold white paper on short diameter. Cut crocus blossom from dark violet paper 1″x2½″. Illus. 4. Fold light violet paper 1½″x2″ on short diameter. Cut crocus buds. Illus. 4 A. Paste crocus blossom on folder end of stem a little above 4½″ edge. Paste crocus buds at sides of blossom ends of stems on line with end of blossom stem. Slash irregularly 4″ edge of green paper 1″x4″. Paste on folder with straight edge to end of stems.

Card No. 5.

Material.

1 pc. brown paper 3″x4½″.
1 pc. white paper 2″x3″.
1 pc. green paper 2″x4½″.
1 pc. green paper 3½″x5″.

From white paper 2″x3″ cut rabbit. Illus. 5. Slash irregularly 4½″ edge of green paper 2″x4½″.



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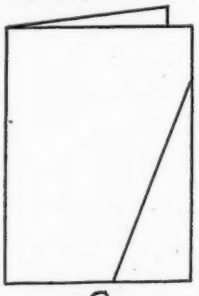
See picture. Paste rabbit on brown paper 3″x4½″. Paste slashed green paper over rabbit and a little above 4½″ edge of brown paper. Mount on green paper 3½″ x5″.

Card No. 6.

Material.

1 pc. brown paper 3″x5½″.
1 piece white paper a little larger than brown paper.
1 piece dark green paper 1½″x5½″.
1 pc. white paper 2″x3″.
1 pc. orange paper 1½″x2″.



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-6A-

Cut one 5½″ edge of dark green paper 1½″x5½″ to represent distant mountains or trees. Cut rabbit from white paper 2″x3″. See No. 5. Cut circle and carrot from orange paper 1½″x2″. Arrange and paste on brown paper 3″x5½″. See picture. Mount on white paper.

Card No. 7.

Material.

1 pc. light brown paper 4½″x12″.
1 pc. dark green paper 2″x3″.
1 pc. bright green paper 2″x3″.
3 pc. red paper 1″x1″.

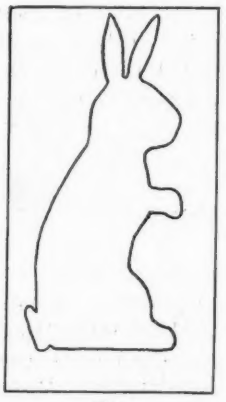
Fold over one 3″ edge of dark green paper 2″x3″ to form oblong about ½″x3″. Unfold. Fold on short diameter, cut as shown in Illus. 6. Open paper, fold down oblong ½″x3″. To hold flat at each end of oblong. Fold three red papers 1″x1″ each on one diameter. Cut tulip blossoms. Illus. 6A. From bright green paper cut stems and leaves. See picture. Fold light brown paper 4½″x12″ on short diameter. Arrange and paste on folder stems, blossoms, leaves, and flower pot. See picture.

Card No. 8.

Material.

1 pc. light green paper 5½″ x6¾″.
1 pc. light violet paper 2″x3″.
1 pc. dark violet paper 1¼″x1¼″.
1 pc. green paper 1½″x3″.

Fold light green paper 5½″x6¾″ on short diameter. Cut hyacinth blossom from light violet paper 2″ x3″. Illus. 7. Fold dark violet on diameter, cut flower pot. See picture. From green paper 1½″x3″ cut



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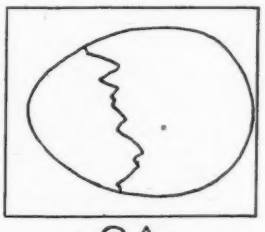


-9A-

ILLUSTRATIONS OF EASTER CARDS 1-12.

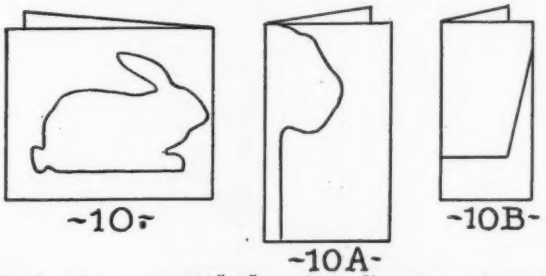
leaves. Illus. 7A. Arrange and paste on green folder. See picture. Draw violet crayon line about ¼" from edges of folder having bottom line a little farther from edge than from other three edges.

Card No. 9.

Material.

1 pc. light green paper 3½"x5¾".
1 pc. white paper 3¾"x 6".
1 pc. white paper 2½"x4".
1 pc. violet paper 2½"x3".

Cut rabbit from white paper 2½"x4". Illus. 8.



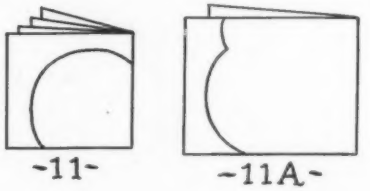
Fold violet paper 2½"x3", on long diameter, cut parasol. Illus. 8A. Assemble and paste parasol and rabbit on green paper 3½"x5¾". Mount on white paper 3¾"x6".

Card No. 10.

Material.

1 pc. yellow paper 2¾"x5".
1 pc. violet paper a little smaller than 2¾"x5".
1 pc. white paper 2½"x4½".
1 pc. green paper 2½"x3".

Cut rabbit from white paper 2½"x4½". Illus. 9. Cut egg shape from green paper 2½"x3". Illus. 9A. Assemble and paste rabbit and egg shell on violet paper. Mount on yellow paper 2¾"x5".



Card No. 11.

Material.

1 pc. dark green paper 4"x6½".
1 pc. orange paper a little larger than 4"x6½".
1 pc. orange paper 1"x1".
1 pc. white paper 2"x5".
1 pc. green paper 2½"x3".
1 pc. green paper about ¼"x5".

Fold right paper 2″x5″ on short diameter. Cut rabbit. Illus. 10. Fold green paper 2½″x3″ on long diameter. Cut tree. Illus. 10A. Fold orange 1″x1″ paper on diameter. Cut tub. Illus. 10B. On dark green paper 4″x6½″ paste green paper strip ¼″x5″ having 5″ edge and ends of strip equal distance from 4″ edges of large paper. Assemble and paste tree, tub, and rabbits. See picture. Mount on orange paper.

Card No. 12.

Material.

1 pc. gray paper 3″x6½″.
1 pc. yellow paper 3¼″x6¾″.
1 pc. dark blue paper 3¾″x7⅜″.
1 pc. dark green paper 1″x2¾″.
1 pc. light green paper 1½″x3″.
1 pc. red violet paper 1½″x1½″.
1 pc. blue violet paper 1½″x1½″.
1 pc. light red paper 1½″x1½″.
1 pc. light weight paper 1½″x1½″.
1 pc. yellow paper about ½″x1½″.

Fold light weight paper 1½″x1½″ on diameter. Keep folded, fold on short diameter. Cut pattern. Illus. 11. Open pattern flat. Trace flower on three colored papers 1½″x1½″. Cut forms. Fold on short diameter yellow paper ½″x1½″ in three parts. Cut three small circles. Paste in center of three flowers. Fold dark green paper 1″x2¾″ on short diameter. Cut bowl. Illus. 11A. From light green paper 1½″x3″ cut stems and leaves. See picture. Assemble and paste stems, flowers, leaves, and bowl on gray paper 3″x6½″. Mount gray paper on yellow and yellow on dark blue.

High School Calendar

A Project Showing Close Correlation Between the Department of Printing and Fine Arts

Ora Strange, Supervisor of Art, East Orange, N. J., High School

IN these days when even experts in education seem to differ concerning such terms as project and problem, it becomes the part of wisdom to make use of definitions. The term project as here used may be defined as a purposeful plan, formulated for a specific purpose, and visualized in suitable concrete form.

Before any project can begin to take visible shape, a number of decisions must be made. This particular project called for decisions concerning the following points:

1. Number of sections. Class discussion resulted in the choice of six pages and an ornamental cover.

2. Amount of printing on each section. Further discussion determined that each page should show two sections of the calendar and two recipes furnished by the supervisor of household arts.

3. Size and shape. The horizontal oblong chosen seemed to be the shape best suited to accommodate the given amount of printing.

As soon as these points were decided upon, the boys in the print shop began the work. One of the boys was appointed as foreman. He assumed responsibility for the completed project but was allowed to select as many assistants (ten in this particular case) as he deemed necessary.

The head of the department was always ready to give advice whenever called upon or at such times as he judged necessary, but the foreman and his assistants were encouraged to make all possible decisions.

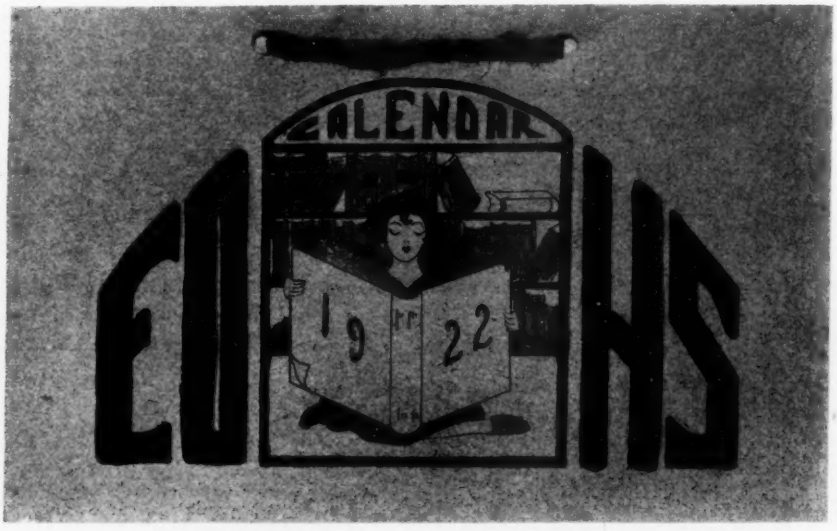


PLATE I. FRONT COVER OF THE CALENDAR.

The following method of procedure was determined upon:

1. Choice of type. In the nature of the case, this demanded the selection of a size that would admit of the proper placing of the required copy within given space.
2. Arrangement of two sections of calendar and two recipes.
3. Set up type.
4. Print proof.
5. Lock up in chase.
6. Make ready form on press and print.

While boys in the printshop were preparing copy, the students in the art department were busy making designs for the cover.

This decorative design was given as an optional problem for third and fourth-year students.

At the time specified 22 finished designs were submitted and out of this number three were selected by a committee consisting of superintendent of schools, the high school principal, and the art director.

Zinc plates for these designs were made by professionals because this process was one beyond the capabilities of the student.

When these plates arrived the cover pages were run through the press and then returned to the art department to be hand-colored.

The work of assembling the six pages and the cover, punching the holes and trying each calendar was done in the shop.

The cover design of Plate 1 shows a studious girl making use of a reference book in the school library.

Plate II shows a girl and boy intent upon preparing their lesson for the following day. The tower on each side is a freehand sketch of the clock tower on the high school building.

In Plate III the gargoyles symbolizing learning were sketched from a part of the ornamentation above the entrance to the school building. Before students went out to make their sketches, they were given a brief history concerning the origin and use of gargoyles.

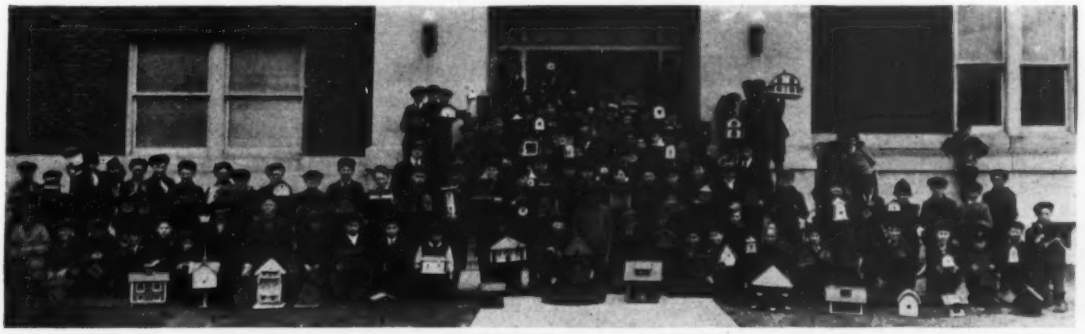
PLATES II AND III. TWO ALTERNATE COVERS.

The calendar was developed upon sheets of gray paper showing a slightly rough surface.

The one shown in Plate I was worked out in a monochromatic or one mode scheme (two tones of blue) with the addition of a few spots of gold. For those shown in Plates II and III a complementary scheme of orange and blue was chosen.

The completed calendars were sold to students of the school for the nominal sum of a quarter each which covered the cost of material and added a small amount to the general school fund.

Considering the fact that students were interested in the work and more calendars were desired than could be produced in the given time, the project was pronounced a success.



PREPARING FOR A BIRD HOUSE CONTEST IN MARINETTE, WISCONSIN.

These bird houses were made by the seventh and eighth grade boys in the Manual Arts Department of the Marinette Schools. The exhibit was held at the public library, where the houses were judged by a committee of three citizens on the basis of originality of design, construction and practicability. Four prizes were offered for the best productions, the prize money being contributed by the Kiwanis and the woman's Clubs of the city. The work was carried on under the direction of William Schenke and G. W. Schefelker. The following month the flower boxes for windows and porches were made and put on exhibit in the same way.

INDUSTRIAL-ARTS MAGAZINE

E. J. LAKE S. J. VAUGHN
Editors

EDITORIAL

DON'T YOU WISH YOU COULD?

William M. Chase, the notable American artist and teacher of art, replied to the student who insisted that he could not see blue in the shade hue of a white cow, with the question, "Don't you wish you could?"

A normal mind should be prejudiced in favor of the evidence of its own senses. The pupil who meekly or indifferently agrees with the teacher's conclusion and does not seek conviction, has little prospect of development.

Excellent teachers avoid the arbitrary statement of conclusions. It is far better pedagogy to lead a pupil to a conclusion of his own than to thrust a conclusion upon him. Matter of fact teaching is far too prevalent. It is necessary to give information, but information, like most gifts, is apt to be unappreciated and ineffective unless conviction of truth and need is developed with the possession of the fact.

Faith in even the best of teachers is too little support of a definite conclusion. The good pupil is constantly proving the teacher right or wrong. That subtile thing called truth is usually conditional, and depends on the point of view. So we find a teacher of the subtile truths of art refraining from the positive statement that the hue of white in shade is blue, and suggesting a little research by the encouraging question, "Don't you wish you could?"

ENRICHED VOCABULARY.

In this time of much and increasing publication there is need and opportunity for enriched vocabularies. The vocabularies of art and industry are valuable to every one whether engaged in artistic and industrial pursuits or not, and are generally neglected by persons who are confined to academic study.

Words such as band, border, fringe, frieze, cresting have little distinctive meaning until these accessories to design have been studied with reference to their purpose and expression. Terms common to the building trades and architecture, such as jamb, soffit, spandril, groin, coffer, pediment, lintel, dome, vault, gable, and buttress should be understood because the forms they represent are evident to most people frequently.

There is much of analogy in the terms of art and industry which is of value to literary expression and understanding. Common words, such as bond, link, stool, apron, key, band, tie, collar, lug, and thread have different meanings to different people, according to their interest. In the clear understanding of such terms, the language teacher and the industrial art teacher must get together, for constant use is made of these terms in reading and speaking.

THE ANARCHIST IN THE SCHOOLS.

Occasionally an anonymous communication finds its way to the editorial desk, which is written by some teacher who rails against the school authorities, holds that the whole scheme of education is capitalistic, and predicts dire consequences to the nation.

The writers of this kind are always too cowardly to sign their names, or come out into the open with their dangerous doctrines and poisonous propaganda. A screed of this character was received recently with a New York City postmark, in which the writer classes the American teachers as slaves, the parents as vassals, and the superintendents and principals as tyrants and brutes.

Malcontents of the Trotzky and Lenin type have no place in the American schools and should be rooted out forth-with. School authorities can do no better then to scan their lists of teachers and cull out those who entertain anarchistic tendencies. They can be of little service in training the American child to that citizenship which makes for the stability and progress of a great nation.

BETTER UNDERSTANDING AMONG THE VARIOUS AGENCIES OF EDUCATION.

It is most encouraging to observe the rapidity with which the various fields of vocational education are coming to proper recognition and balance.

The discussions in recent conferences and associations indicate a clearness of vision not so apparent a few years ago.

It is an interesting fact that discussions in new fields usually begin with those extremes that seem impossible of reconciliation. Early discussions always emphasize differences. As time goes on, the emphasis shifts to common ground and matters of more general agreement become the basis for consideration and discussion.

Only recently have the fields of commercial and agricultural education been thought of in the same way as have trade and industrial education. For a long time any discussion of vocational education was based upon the assumption that vocational education meant trade, shop, or industrial work. Long after the leaders in this field had the various forms of vocational education fully differentiated, the common understanding clung to the old conception.

Indeed, the national organizations for vocational education only in the last few years have incorporated commercial and agricultural work in their studies and given it recognition on their programs. Now, however, these two lines have become fully equal in importance and recognition to any of the other phases of vocational education.

Commercial work and agricultural education lend themselves as readily and as easily to the right type of organized instruction as any subjects in the whole field of vocational education. Moreover, the demand is fairly constant in both lines; the body of instruction material is clear-cut and definite, and the student groups are actuated by specific vocational motives.

At the same time that matters are clearing up in the vocational field, a better relationship has been established with the leaders in the field of general education. We are witnessing now in every convention a sane, concise restatement of the fundamental principles of education.

This is what we have been longing for all these years—a coming together of all these agencies of education that seem at first in conflict and that prove in the end to be parts of the same great onward movement toward universal education.

AS OTHERS SEE US.

Some interesting conclusions are reached by committees appointed in England to survey the educational field and recommend subjects and methods of instruction most important to the better education of his Majesty's subjects.

As in other countries disturbed to desperation by the war, England conceives the cure for social and economic difficulties to be in education. As for subjects these committees for the most part consider the English language and the literature of it most important and the history of Greek and Roman civilization as of very great importance.

The sciences are not ignored or condemned but it is clearly implied that England needs more of the humanities in her education.

The most interesting feature of these reports is the reference to methods of teaching. Strangely enough to the American teacher we are pointed to as superior in the art of pedagogics over the English and continental teacher, and that too in the profession which we consider ourselves weakest. The method of conducting instruction to secure for the pupil that self-reliance and ability to carry on with optimistic faith in himself and his work has been our great desire.

Our English observers seem to think we have succeeded.

THE HEIGHTS OF SUCCESS.

There are still many who would represent the figure of success as waving a flag and mounting toward the peak of a high hill with the cry of "Excelsior", while struggling humanity in general hangs on the edge of a precipice and contends for a bare foothold that will keep them from destruction.

On such false assumption, Democracy has been ridiculed, and many writers and speakers have tried to get a hearing for destructive criticism and fantastic theories of government. Much of this misrepresentation has taken hold of our school boys and girls.

If such a figure of success ever reached the peak of such a height of success he would find cold and lonesome comfort in the achievement. Success depends for its existence on an appreciative following. Of course the road to the heights of success inclines upward, otherwise it would not be worth the struggle. This road is lined with mirrors for the introspection of travellers. All the opportunities offered gratis along the way by benevolent government or society will never hoist the individual up the incline. The individual must study himself and adapt his abilities to the climbing process. He must also not attempt to go it alone or roughshod over others, or his success will turn to failure for want of support.

The heights of success are broad heights capable of accommodating a great variety of accomplished persons. Art Teacher: have your class in drawing illustrate the Heights of Success and the road leading to it. It will make a good class project and give a little practice in several things worth while.

A WORD IN DISGRACE.

The word "practical" has been brought into disfavor among school folks. When a word changes meaning through the arbitrary use of it by some enthusiast, the fault lies with others. The word "practical" has been used so persistently by those who see in the operation of making something for mechanical use a complete educational process, that it has met with disfavor by those who conceive that this process is not completely educational.

No thoughtful advocate of the industrial arts will contend that "the coordination of the brain and hand in the production of a piece of work" is necessarily a complete educational process. We learn to think by thinking; to reason by reasoning; to do by doing—all of which are educational and certainly "practical" to the end of education.

The content of a complete educational process involves experience in a variety of practical things. The word practical applies to all purposeful and successful operations in education.

Basketry is one of the industrial arts which can be well utilized in the schoolroom, and has a high educational and commercial value. The basket maker learns form, proportion, design, symmetry and accuracy, appropriate coloring for different uses, as well as various modes of decorating. Serving trays, jardinieres, work baskets, shopping bags, coasters, baskets for fruit and for flowers, window boxes and hanging baskets are among the many types constructed—Marie C. Druse.

The exquisite sensitiveness of hand and mind working together is nowhere better illustrated than in the case of the "surface plates" used by mechanics for obtaining absolutely flat surfaces. These plates are in pairs, and after the machine has done its best they are gone over carefully by hand, and scraped and dressed so that the two surfaces are in absolute contact. It is impossible to do with the machine what the trained eye and hand can accomplish in dressing down almost imperceptible protuberances on the iron.

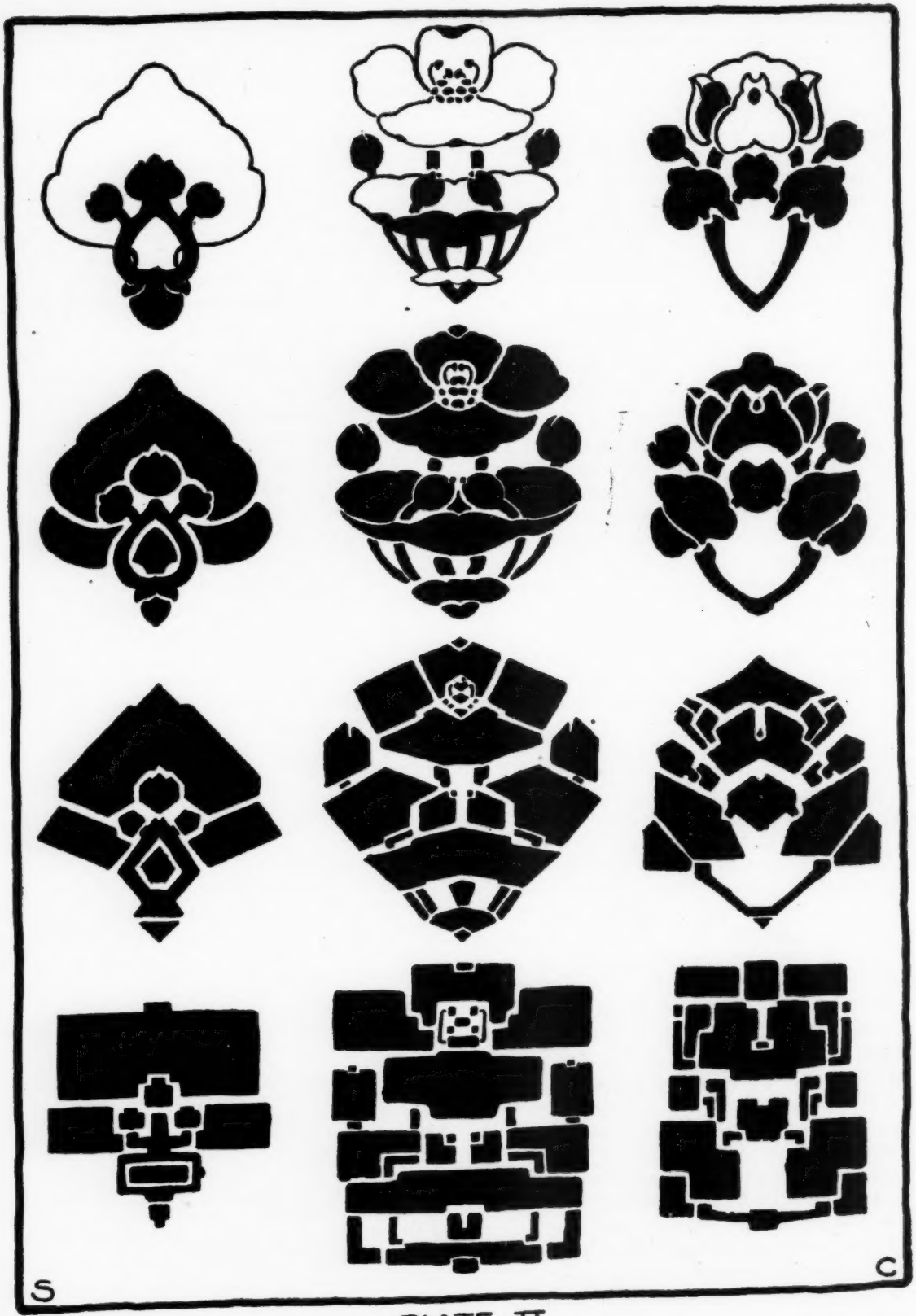


PLATE II

DRAWN BY MISS SARAH COHOON, SPRINGFIELD, MASS.

PROBLEMS AND PROJECTS

The Department of Problems and Projects aims to present each month a wide variety of class and shop projects in the Industrial Arts. Successful problems are invited and will be paid for. A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing. The originals of the problems in drawing and design should be sent.

Problems in benchwork, machine shop practice, turning, patternmaking, sewing, millinery, forging, cooking, jewelry, bookbinding, basketry, pottery, leather work, cement work, foundry work, and other lines of industrial-arts work are desired for consideration. The editors will not accept the old hackneyed problems of footstools, taborets, towel holders, etc., which have been made from time immemorial, ad nauseum.

Drawings and manuscripts should be addressed: The Editors, INDUSTRIAL-ARTS MAGAZINE, Milwaukee, Wis.

DAVENPORT TABLE.

E. J. Mathy, Instructor in Woodwork, Chisholm, Minn.

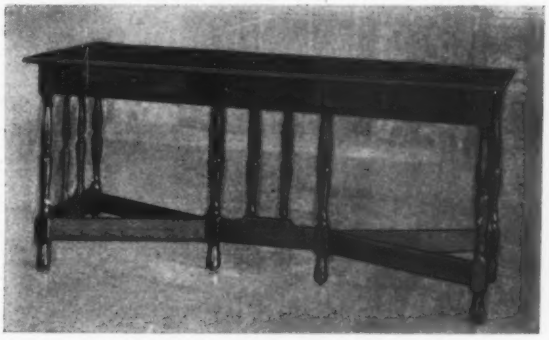
The Davenport Table is rapidly taking the place of the common library table, especially in the homes where there is a fireplace and the living room is large enough to accommodate the davenport in the middle of the room in front of the fireplace with the davenport table against the back of it.

Here is a davenport table design which can be made by any boy in the high school advanced cabinet making class. The table may be made with or without drawers. Where woodturning is not taught the legs can be tapered instead of turned.

This table is made of black walnut, but can be made of mahogany (real or imitation) or oak. The legs are turned of two inch material and the square part is cut down on the jointer to 1¾". The spindles are turned out of 1½" stock. The rest of the table is all ¾" material

All joints are mortised and tenoned. To get the proper angle for the tenons on the end lower rails that with the exception of the drawer sides and bottom. branch out to the corner legs a top view of the table should be laid out full size on a piece of wrapping paper pinned on the workbench or drawing table.

This makes a very neat and substantial table. It offers a good opportunity for originality and individuality in construction and design.



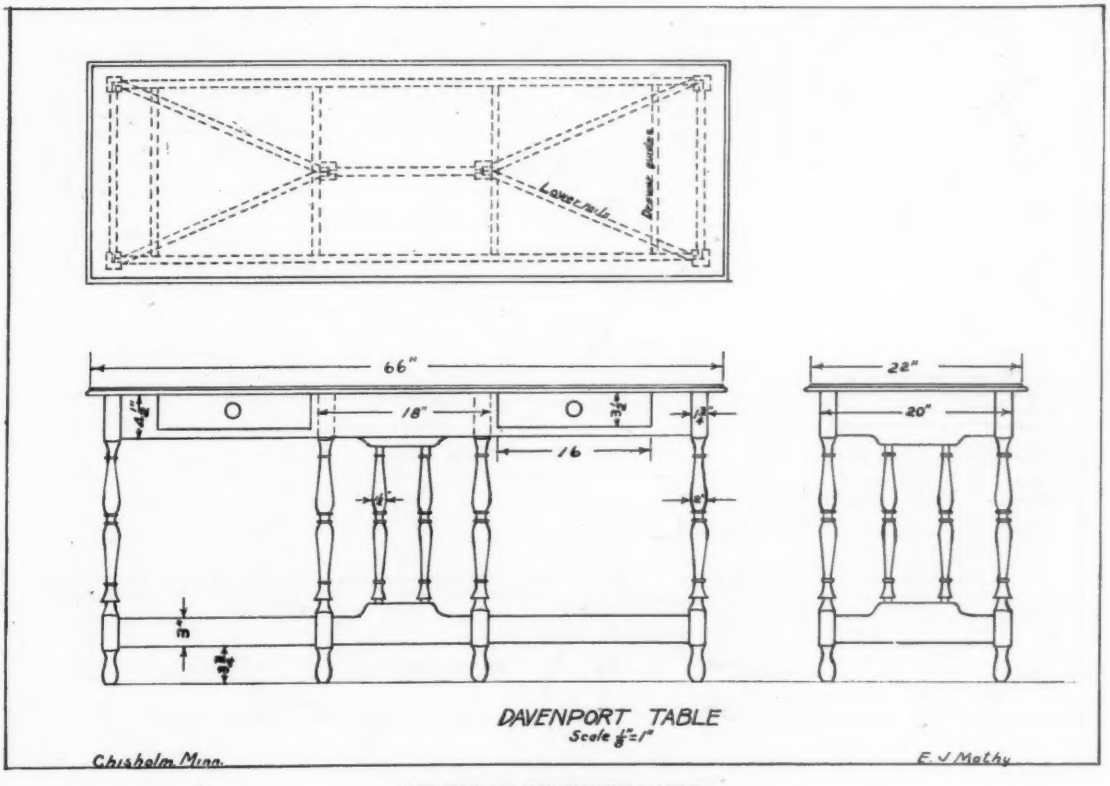
DAVENPORT TABLE.

THE HANDY DUST PAN.

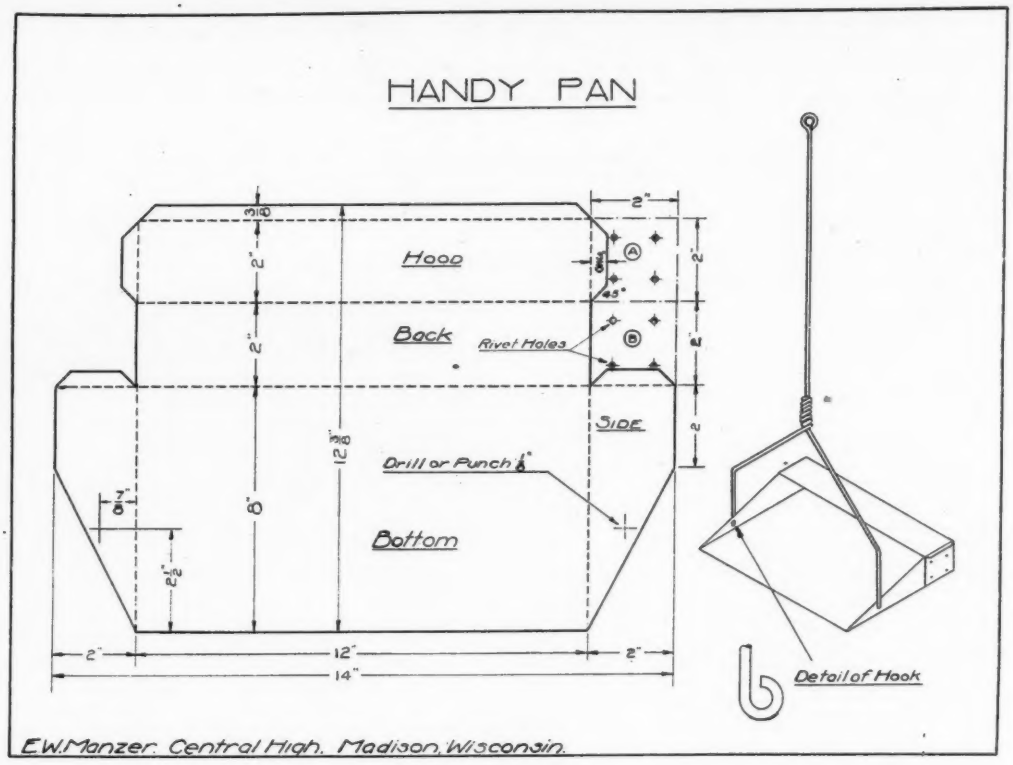
Emerson W. Manzer, South Milwaukee, Wis.

Here is a snappy problem for correlation in development and sheet-metal work. It is a very useful article and one that any mother would be pleased to have, because it eliminates the back-breaking bend that the small pan demands.

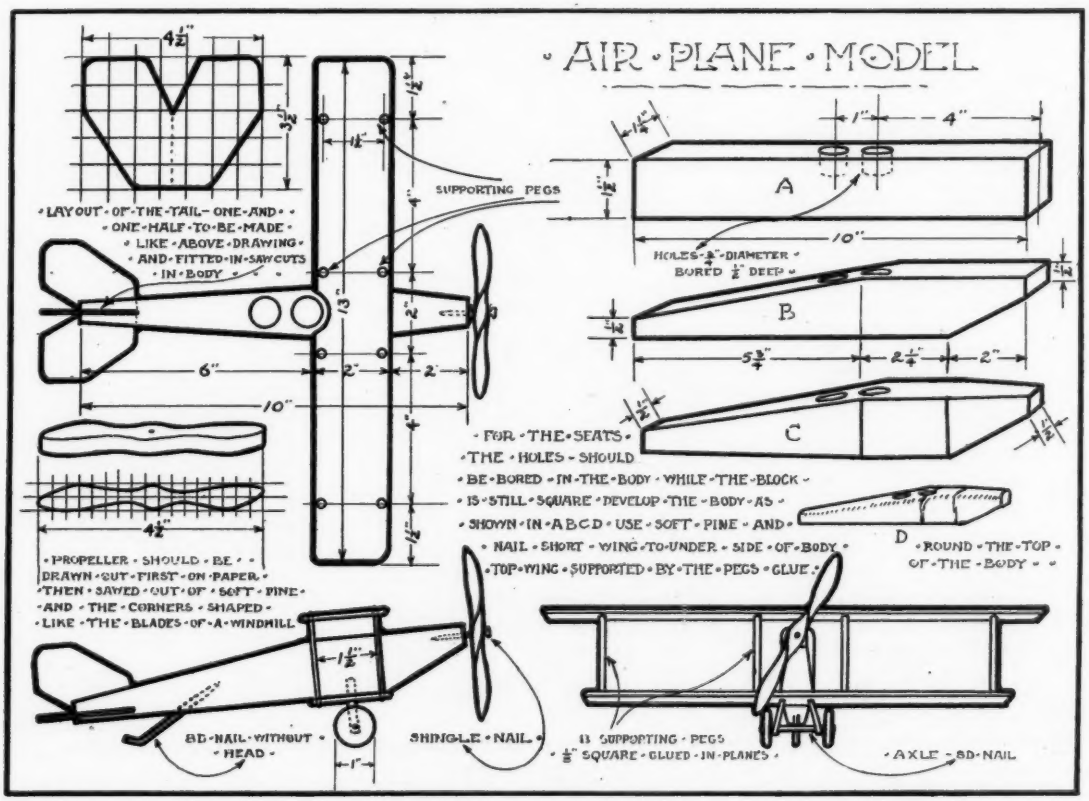
The flops "A" and "B" are used where riveting is desired, and the small flops are used when soldering is the choice. Either may be soldered however.



DETAILS OF DAVENPORT TABLE.



DETAILS OF HANDY PAN.


AIR PLANE MODEL
SUPPORTING PEGS
LAY OUT OF THE TAIL ONE AND ONE HALF TO BE MADE LIKE ABOVE DRAWING AND FITTED IN SAWCUTS IN BODY
HOLES 3/8" DIAMETER BORED 1/4" DEEP
FOR THE SEATS THE HOLES SHOULD BE BORED IN THE BODY WHILE THE BLOCK IS STILL SQUARE DEVELOP THE BODY AS SHOWN IN A B C D USE SOFT PINE AND NAIL SHORT WING TO UNDER SIDE OF BODY TOP WING SUPPORTED BY THE PEGS GLUE
ROUND THE TOP OF THE BODY
PROPELLER SHOULD BE DRAWN OUT FIRST ON PAPER THEN SAWED OUT OF SOFT PINE AND THE CORNERS SHAPED LIKE THE BLADES OF A WINDMILL
8D NAIL WITHOUT HEAD
SHINGLE NAIL
13 SUPPORTING PEGS 1/8" SQUARE GLUED IN PLANES
AXLE 8D NAIL
A
B
C
D

DETAILS OF AIR PLANE MODEL.

The long handle is hooked onto the pan so that the weight of the pan drops the pan into a perpendicular position when it is lifted up. Two pieces of No. 10 or No. 12 wire may be used. The lengths are optional. Some handles would be longer than others, the length being governed by the height of the person who would use the pan.

The pan is made of medium gauge tin or galvanized iron, painted black. Give this a trial and you will enjoy the results.

AIRPLANE MODEL.

F. C. Hughes, Spokane, Wash.

All boys are more or less interested in the airplane. And most boys are interested in making models of them. These models do not have to fly to be of interest to the boy. In the author's experience the airplane shown in this article is one of the most popular in a large number of projects. While it is of the non-flying type of model, it conforms very closely to the lines and proportions of the smaller, heavier-than-air models now in use by the best flyers of the country.

For boys of the fifth and sixth grades this project is one which conforms to the general type of construction, and method of tool operation, found in most of our better elementary schools.

The accompanying drawing will make most of the points of construction clear; however the following notes will doubtless be helpful.

Body: Good, straight, soft pine or other equally soft wood will help a lot in shaping up a first class body.

Wings: For the wings ¼" or 3/16" Soft wood should be used. Metal cannot be used because of gluing the connecting pegs into place. The bottom wing is the same as the top one excepting 1 inch shorter at each end. The top one is cut in the middle as shown for the pilot's seat.

The holes in the wings, for the pegs may be marked with pattern and drilled with an awl. Square pegs may be used.

Tail: The tail may be cut from heavy tin or other metal or shaped from very thin wood such as berry boxes.

These parts for the tail are set into slots sawed into the body.

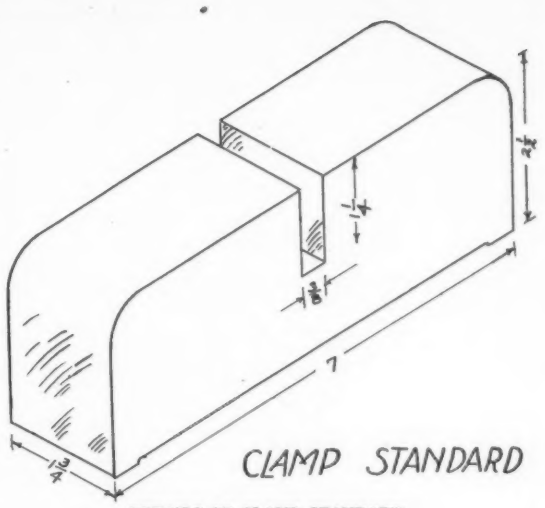
When the whole is finished as shown in the drawing, the body, wings and tail may be painted light grey or white. The propellor, wheels and runner may be painted bright red. Bright red spots may also be painted on the upper and lower sides of the wings as found in real planes.

To fasten the model to the auto or bicycle as ornaments, or to the post or shed as a weather-vane and windmill; balance the model on the edge of a knife blade or piece of thin metal and drill a hole in the body at the point of balance, to receive the wire or rod that is to act as a pivot.

CLAMP STANDARD.

Wm. V. Winslow, North Tonawanda, N. Y.

The clamp standard illustrated is one which I believe is used generally in industrial practice where long steel bar clamps are employed. The drawing is made according to dimensions taken from a pine block used in a general woodworking establishment. Horses can be



DETAILS OF CLAMP STANDARD.

notched at intervals to hold such clamps in position while gluing is being done, but where the work is handled on a bench top or on any larger surface as on a special table or on the floor, the standard illustrated is convenient if not necessary. In school shops gluing is a difficult process for reason that the clamps are not easily managed and the time required to manipulate them allows hot glue to cool or set before they can be adjusted. The clamp standard helps considerably to over come this difficulty.

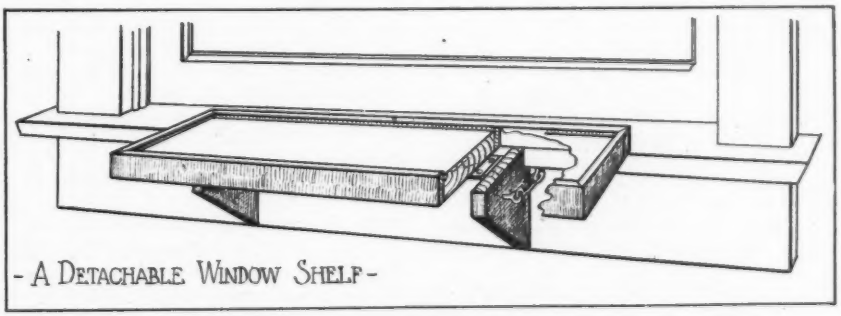
A HANDY DETACHABLE WINDOW SHELF.

Edwin M. Love.

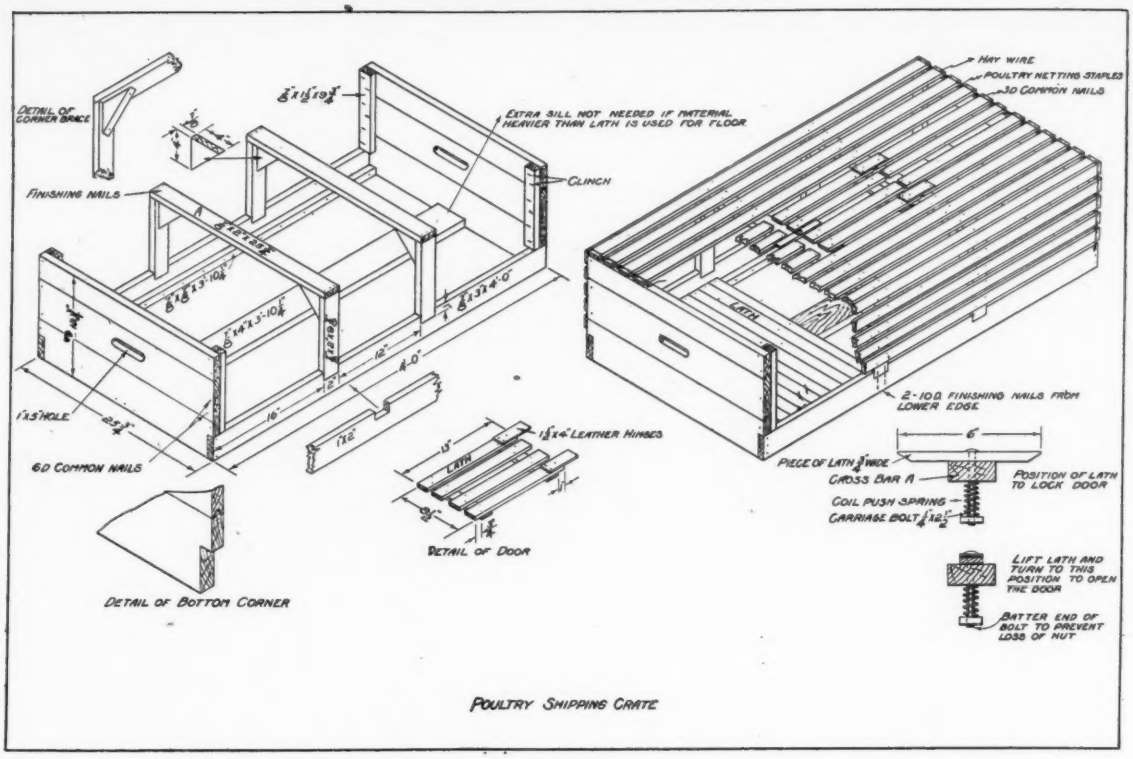
Many housewives find it desirable to put cans of milk or packages of butter in an open window over night to keep them cool, when there is no icebox or cooler in the house. The shelf illustrated was designed to meet this need, and is a splendid woodworking project for sixth or seventh grade boys. It can be put up at any window, and can be folded up and removed when not in use. It can be used also to hold flower pots.

The construction is simple. Smooth up a rectangle of pine or hardwood, and nail a quarter-inch strip around the edges, making a projection on the upper side of the board to keep articles placed on it from sliding off. To the under side secure two triangular brackets at equal distances from the ends by means of strap or butt hinges, so that they may be folded flat when not in use. The back, or vertical edges of the brackets are set even with the back edge of the shelf, and are notched back one inch. and 1½ inches from the bottom of the shelf, so as to fit over the projecting edge of the window stool. Since the back edges of the brackets bear against the apron, they are faced with felt so that they cannot mar the finish.

Measure the distance from outside to outside of the brackets, add ½ inch to the length, and center the measure-



DETAILS OF DETACHABLE WINDOW SHELF.


DETAIL OF CORNER BRACE
FINISHING NAILS
EXTRA SILL NOT NEEDED IF MATERIAL HEAVIER THAN LATH IS USED FOR FLOOR
CLINCH
HAY WIRE
POULTRY NETTING STAPLES
3D COMMON NAILS
LATH
2-10D FINISHING NAILS FROM LOWER EDGE
6
PIECE OF LATH 3" WIDE
CROSS BAR A
POSITION OF LATH TO LOCK DOOR
COIL PUSH SPRING
CARRIAGE BOLT
LIFT LATH AND TURN TO THIS POSITION TO OPEN THE DOOR
BATTER END OF BOLT TO PREVENT LOSS OF NUT
1"x3" HOLE
6D COMMON NAILS
1½"x4" LEATHER HINGES
DETAIL OF DOOR
DETAIL OF BOTTOM CORNER
POULTRY SHIPPING CRATE

DETAILS OF POULTRY SHIPPING CRATE.

ment on the window stool. At the two points so marked screw in screw eyes on the underside of the stool. Then attach to the outer side of each bracket a heavy screen-door hook, placed so that the hooks will engage the eyes on the window stool when the shelf is held in position. It will be seen that these hooks will hold the shelf firmly to the window stool.

A white gloss enamel is the best finish for the shelf, as it is easily cleaned and withstands water. However, stain protected with wax will do very well.

POULTRY SHIPPING CRATE.

L. M. Roehl, Cornell University, Ithaca, N. Y.

This poultry shipping crate is light, substantial and of such material as is available by farmers. It is simple of construction and requires only the ordinary tools which farmers have at hand.

The ends are made of matched fencing though any other inch lumber is as suitable. The boards in the ends are fastened together with a cleat at each end on the inside. The cleats are fastened to the boards with 6d common nails which are clinched on the inside. It should be noted in the drawing of the framework that the cleats are three inches shorter than the height of the crate. The bottom ends fit down onto the sills.

An opening 2″x5″ is made in each end for a hand hold to facilitate handling the crate. These holds are made with the one inch auger bit and a wood chisel.

An opening is cut in each end at the lower corners ⅞″x3″ to allow the sills to fit in flush. These openings are cut with a crosscut hand saw and hand rip saw.

The sills are ⅞″x3″x4′ 0″. This length has been selected because it is the length of a lath. As may be noted in the framing details, openings one inch deep by two inch wide are cut in the upper edges of the sills at points sixteen inches from the ends to allow the posts to set into the sills.

Strips of wood ⅞″ square are nailed to the inside of the sills at the bottom edge to provide a resting and nailing surface for the floor. Four penny finishing nails are used for fastening these pieces to the sills. It should be noted that these pieces are only 3′ 10¼″ long and the ends butt against the ends of the crate. They may be nailed in place before the crate is assembled.

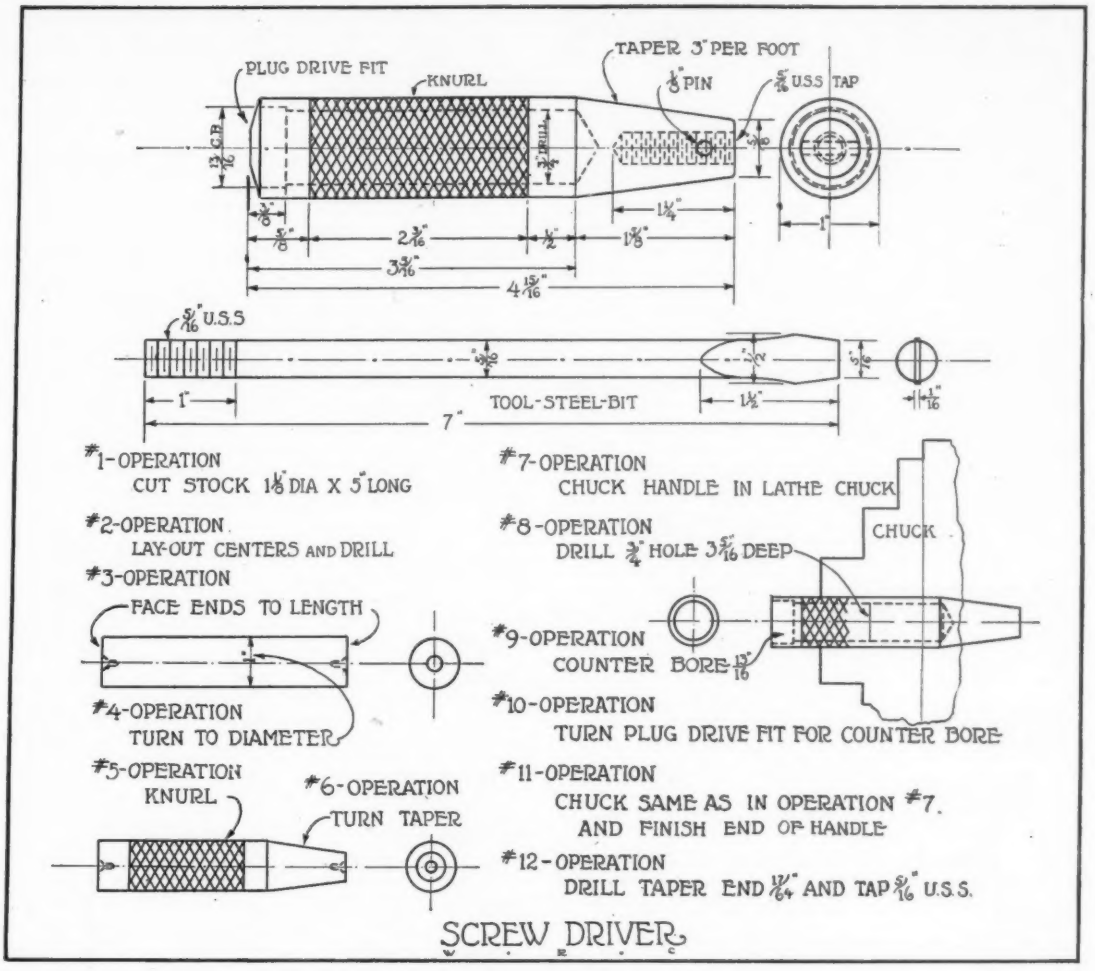
The sills are fastened to the ends with three penny finishing nails at each end of each sill.

The two frames for supporting the door and strengthening the crate are alike. Each consists of two posts ⅞″x2″x9⅞″, a cross member and a triangular block ⅞″x4″x4″ in each corner. The posts are set into the openings in the upper edges of the sills and are held in place with two 10d finishing nails driven from the bottom edges of the sills. The top cross members are fastened to the upper ends of the posts with three 8d finishing nails in each end of each piece. The corner braces are toenailed in place with 4d finishing nails and then further fastened with 8d finishing nails as shown in the drawing of the framework.

In this plan lath is used for the floor because it is the only light material usually carried in stock in the local lumber yard. The width, of the crate which is 25¾″ has been selected because the four foot lath may be cut in two in the middle and both pieces used for flooring. If lath are used an extra sill ⅞″x4″x3′ 10¼″ is placed as shown in the drawing of the framework to support the lath. This sill butts against the ends at the bottom and is fastened in place with three 10d finishing nails driven through the ends at bottom.

If matched fencing or other material heavier than lath is used the extra sill may be omitted. If half inch lumber can be obtained from dry goods boxes it is very suitable for the floor. The lightest lumber available which will serve as a floor is to be preferred so as to make the crate as light as possible.

The lath are fastened with 3d common nails, Five four-foot lath are used at each side and eight at the top as shown in the drawing. They are held in place with three penny common nails. Four lath are cut for the short pieces and door. The door is made of four short pieces



DETAILS OF SCREW DRIVER.

and two cleats dimensioned and assembled as shown in the detailed drawing of the door. The door works on two leather hinges. Any pieces of scrap leather from old harness or shoes somewhere near the dimensions called for in the drawing are suitable. The hinges are fastened with 3d common nails which are clinched on the inside.

The lock consists of a piece of lath or hard wood ⅜"x¾"x6" which is beveled at each end as shown in the drawing, a ¼"x2½" carriage bolt and a small coil spring one inch long. A one-fourth inch hole is bored through the top cross member opposite the hinges at center. A one-fourth inch hole is bored through the lock at center. The bolt is placed through the wood piece, then thru the hole in the cross member; the spring is then stripped on the bolt and held in place with the nut. The bolt is sufficiently battered at the end to prevent the nut from dropping off. The spring holds the lock down on to the cross bar A. The lock may be raised and turned parallel to the cross bar A and the door opened.

The ends of the lath are further fastened by running a piece of hay wire over them as shown in the drawing and then fastening the wire between the lath with poultry netting staples.

THE SCREW DRIVER.

W. Ray Challoner, Appleton, Wis.

This tool as a shop problem is not new to a number of schools I have visited, but it is one that has an interest value from the student side, and a job that a boy is sure to be proud of if it is well made. It should not be allowed to leave the school shop until it compares favorably with the commercial product as to workmanship.

The use of the drawing as a means of obtaining information is important for the student to learn while at work at some problem. By insisting on his obtaining the information from the drawing submitted, the instructor can create a confidence in the worker's ability to read drawings. I have in mind, in reference to this problem, the average student who attends the continuation school machine shop. My experience with this problem has led me to believe that for the first lathe work, this problem is useful. Before starting the student on the screw driver, if he has never had any lathe work, I would give him an exercise problem which consists of centering a piece of stock one inch in diameter and facing it for some definite length with a facing tool, first demonstrating the use of the tool, that he may proceed in the proper manner.

Explain and demonstrate the use of the caliper and how to set same from a scale; also how to obtain size by allowing the instrument to pass over the job, using the weight of the caliper for pressure. Explain the setting of the tool to a center height, and how and why it must be ground in the proper shape. After this explanation and demonstration, allow the student to turn the piece down 1/16" at a time, checking for each cut, until the piece is one-half inch in diameter. Now demonstrate how to file and polish and protect the work from marks of the dog by the use of a copper shim. Then knurl the piece to some given dimension.

The student has now had sufficient contact with lathe work to make a screw driver in an acceptable manner with some explanation in connection with operations six to twelve.

When the handle is complete, give the boy enough forge work in exercises such as that of making the staple, draw spike and so on, until he knows how to heat the stock and handle the hammer on the anvil.

Before giving him the piece of steel to make this screw driver blade, have him draw out a piece of 5/16 round iron or steel to a satisfactory blade, working to a sample. When he is able to do this work, explain the danger of over-heating tool steel. Then give him a piece to draw out. After this forge work is completed, have the piece threaded and filed to shape on the bit end and polished. Then assemble in the handle, being sure that it enters far enough so that the thread does not show. Drill one-eighth inch hole through blade and handle, drive in a pin, file and polish flush with the surface.

The hardening and drawing to color should be done by the instructor, or under his direct supervision, as the tendency is for the student to make this blade too hard for use.

A "HOME-MADE" PERSPECTIVE STRAIGHT EDGE AND BEAM COMPASS.

Chas. W. Frost, Philipsburg, Mont.

The devices shown here serve to enlarge the ordinary drawing board to any required dimensions for making linear perspective drawings; and arcs of circles larger than can be drawn with common bar compasses.

The drawings are self explanatory, so far as methods of construction are concerned, but it should be noted that the bars of the clamp 1 and 1, and the straight edge 4, can be made any length desired.

Names of Parts.

1. Bars of clamp.
2. Hinge.
3. Hinge pins (⅜" dowels).
4. Straight edge.
5. Pivot pin (⅜" dowel)
6. Tightening bolt (¼"x4").
7. Drawing Board.
8. Fixed section of beam compass.
9. Pivot hole.
10. Thumb screw (for marking gage).
11. Sliding section of beam compass (⅜" dowel).
12. Head of beam compass.
13. Thumb screw.
14. Pencil, a ruling pen.

WESTERN ARTS ASSOCIATION CONVENTION.

The Western Arts Association will hold its next annual convention May 2, 3, 4, and 5, at Cincinnati, Ohio.

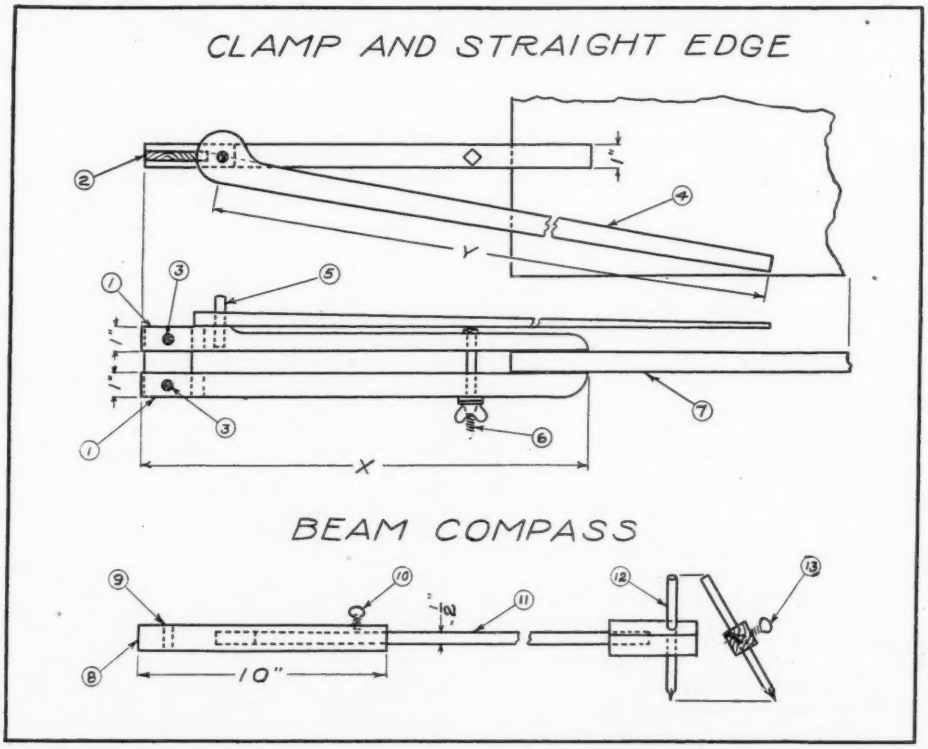
The general sessions of the convention will be held in the beautiful Emery Auditorium, which is a part of the Ohio Mechanics Institute and has accommodations for over two thousand persons. In addition to the general meetings, there will also be a number of sectional meetings, where special subjects will be presented and discussed and round-table matters presented for general discussion.

The exhibits will be displayed in the Mechanics Institute Building, at Walnut and Canal Streets. This building is a modern structure, five stories high, and occupies an entire city block. In this building will be exhibits of drawing, painting, handicraft, arts and crafts, ceramics, gowns, embroidery, woodwork, forging, sheet metal work, printing and all types of work designed and executed by pupils of these subjects in the schools of the Middle West.

The annual dinner will take place in the dining room of the East High School, where the guests will be afforded an opportunity to hear the splendid organ of the school.

A number of speakers of national importance will be present to discuss the subjects of art, domestic science, household arts, industrial arts, and manual training. Teachers will enjoy the treat of visiting the wonderful art collections, the splendid high and trade schools, the art academy and museum, and numerous industrial plants known the world over.

Information concerning the program may be had by addressing Mr. L. R. Abbott, 234 North Division Ave., Grand Rapids, Mich.



DETAILS OF TWO HANDY DRAWING ROOM UTILITIES.
Designed by Mr. C. W. Frost.

PATTERNMAKING AS A VOCATION.

C. F. Brockway, Boys' Counselor, East High School, Erie, Pennsylvania.

Patternmaking is the art of making wooden forms from which the molder obtains the impressions in sand for securing castings in iron or other metals.

The patternmaker is given a blue-print from which he must work out design in wood. In some difficult cases a full-sized working templet or a drawing is given to him. He must select well seasoned wood of the best grade. White pine, mahogany and cherry are most commonly used.

The parts are shaped by hand and machine tools and then assembled with regard to draft or taper, leaving pieces loose to help in drawing the pattern from the mold.

The assembled parts are sand papered and several coats of shellac applied which make a hard, smooth surface capable of resisting moisture.

Accuracy in the construction of the pattern and core box is absolutely necessary to insure proper thickness of metal in the casting.

Master patterns in plaster paris or wood are often made from which metal patterns are cast. Metal-pattern making is the fitting up and the finishing of a metal casting for use as a pattern.

The metal pattern is received by the workman after it has been pickled and thoroughly cleaned. Blow holes are filled with solder or white metal. The casting is filed and scraped and then given a coat of schellac; sometimes a coat of wax.

The tradesman may be called upon to braze pieces to the metal pattern.

Considerable skill is required in all metal pattern work. This is especially true in stove work.

'Accuracy, patience, foresight, dexterity, and keenness of sight are the chief personal qualifications for the trade. Every boy who considers entering the trade should check himself carefully on these points. Possibly the greatest personal qualification is special adaptability to the various work which the skilled man may be called upon to do.

The best class of the work stimulates interest and intelligence because of the variety of problems presented.

Men are nearly always recruited for the trade through a four-year apprenticeship course. The entrance age usually is between 16 and 18. Boys who have had at least two years in trade school courses may be expected to become efficient in two years of apprenticeship work. The apprentice should have at least an elementary school education with mechanical drawing and prevocational courses in woodworking. Instruction in drawing, blue-print reading, mathematics, and the relation of pattern construction to foundry practice, should be obtained in school or shop. The tradesman must know about the selection of various kinds of woods, the shrinkage of metals, and the proper use of glue, screws, and varnishes.

Skill must be acquired in handling a great variety of hand tools and machines.

As a rule there is no provision made in shops for systematic instruction of apprentices. Success depends largely upon the intelligence and disposition of the foreman and fellow workers and the class of work done in the shop as well as upon the initiative and grit of the apprentice.

Lack of adequate training in mechanical drawing and shop mathematics is the most common deficiency in preliminary training as reported by employers.

SYMBOLIC COLOR CARDS ISSUED BY THE EASTERN ARTS ASSOCIATION.

The special courses in trade and technical knowledge as well as part of the practical experience of the apprentice may be acquired in a trade school course. It is well for the young apprentice to continue his technical training in night schools or through worthy correspondence schools.

The apprentice may hope to start at $6 to $9 per week and gradually increase to $9 to $18 per week in the last year of apprenticeship.

The skilled worker will receive from $30 to $50 per week.

The trade is not seasonal but does have considerable irregular fluctuation. The trade is dependent upon the general manufacturing conditions of the country, especially the iron and steel trade.

Eight to nine hours per day and 44 to 54 hours per week constitute the average working period for the trade.

The work does not involve nervous or physical strain. In shops with poor lighting facilities the eyes may be injured.

Lack of safety devices and devices for carrying off dust and poor ventilation may effect the throat and the lungs.

There are about 150 men in the trade locally. When business conditions are normal and the local iron and steel specialties are in full swing there is a steady demand for skilled men in this field.

The usual line of promotion is: apprentice—journeyman—foreman. There is some opportunity for one to establish his own shop for public trade or in building up some type of product for retail trade.

The age of maximum productivity runs from 25 to 55. It is a trade, however, in which men of very advanced age are often found doing first class work.

Read for further information: Purfield: Wood Pattermaking. Perrigo: Modern Machine Shop Construction (Chapter XX). Lutz: The Metal Trades 38 and 39.

MANUAL ARTS COURSE IN INDIANAPOLIS.

Change in Twenty Years—Individual Choice Allowed in Projects.

Changes in courses of study as a rule come about so gradually one does not realize their proportion until a comparison is made over a span of years. Summer house cleaning of the files in the Manual Training Office of the Indianapolis Schools brought to light a portion of the course of study in use in Indianapolis twenty years ago, and also another used ten years ago. Scanning these two courses and the one used today discloses the fact that along with other subjects manual training has made great strides.

When manual training was organized its aims were entirely different from those of the present day. It was added to the curriculum as a sort of educative cure-all. It was going to be just the thing to make the bad boy good, the backward boy more active, the slow boy more speedy and it was also going to tame down the boy possessed with an over amount of energy. Because of the changes in society it was believed that there should be something in the child's school experience which would take the place of the activity work formerly found in the home, and work which called forth the manipulation of tools and materials, under the name of manual training, was added to the curriculum. The early emphasis was placed on the acquiring of skill in the handling of tools and the field of endeavor was limited to the use of wood and woodworking tools. The project made consisted of various kinds of joints which the cabinet maker of that day used. A student who became skillful in the making of these joints was graded high in his manual training work even though the projects made were only models of no particular value whatever.

No thought was entertained as to the advisability of using other kinds of materials and the proper tools to work them and it was many years before these model joints gave way to objects which were of some practical value. When this change came the transition was slow and very little freedom in the choice of projects was given. In Indianapolis only ten years ago a course of study was in use which set forth as regular models such articles as coat and hat hanger, mail box, sled, camp stools, sleeve board, etc. It was assumed that in the making of these projects the pupil would have acquired certain skill in the handling of tools which would be of great benefit to him regardless of his future vocation and that it would function in useful ways through odd jobs which he could do about the home. This theory has been practically exploded for it has been found that handling the wood working tools, no matter how much skill is acquired, does not help the boy to solder a piece of tin, fix the cistern pump, or do such other kinds of household mechanics.

The present day course of study in manual training, while still emphasizing woodwork does not limit the work to this subject, as in many schools the opportunity is given for pupils to have at least a short course in printing, mechanical drawing, shoe repairing, sheet metal, upholstering, repairing and pressing, concrete work or household mechanics. In the woodworking course of the present day, while restricting the beginning boy (6b) to elementary processes, does not limit him to any set of models or objects. Within certain limitations, he may make his own choice as to the thing he wishes to construct. In the seventh grade certain of these restrictions are raised and therefore a wide range of projects is available for his choice, while in the eighth grade having had this preliminary training, the pupil is allowed almost unlimited freedom in the choice of project provided he has proven by his past work that he is capable of making or reading his working drawing and handling the tools and material necessary to the completion of the project. This freedom in the choice of the thing to be made has developed far more initiative, originality and inventiveness than ever before. A report of last year's results just compiled shows that 522 different types of projects were made during the year; the number of which ranged from 1 to 1045. Of the things made in quantities only few were exactly alike. Very often the construction was the same but in detail or shape or size much originality was shown. The total number of projects made by the boys for themselves totaled 15,685. This number does not include furniture made for the schools and left in the buildings or school repair work. The commercial value placed on this kind of work reached several thousand dollars. When it is realized that the above figures cover only the work in the wood shop and that in addition to this kind of work a great many boys have had experience in the other manual training subjects above mentioned, it shows that progress has indeed been made in the last few years.

To show the range of individual projects, two lists are given. One of these consists of the projects of which more than 100 were made and the other the projects given under the letter "C" in the alphabetized list.

I. Bill file, bird house, book rack, bread board, broom holder, camp stool, candle stick, coat hanger, coat and hat rack, cutting board, dutch stool, foot stool, game board, hall tree, table lamp, marble towel holder, match holder, match striker, medicine cabinet, mail box, pedestal, post card rack, ring toss, taboret, tea mat, teapot stand, telephone stand, tie rack, tooth brush rack, towel rack.

II. Cabinet, cake board, calendar panel, camp stool, candle holder, candle stick, cannon-toy, canoe, card rack, card table, card tray, carom stick, castle, cellar door, chair, chair-small, checker board, checker set, chemical cabinet, chemical board, chicken brooder, chicken coop, chicken feed trough, chimes, china closet, chisel racks, Christmas tree stand, churn handle, clock frame, clock shelf, clock stand, clothes hanger, clothes hooks, clothes horse, clothes line winder, clothes rack, coal box, coat hanger, coat rack, coat and hat rack, coat hook strip, coil box, comb case, condensers, cord winder, corner mould, costumer, coupler base, cradle rocker, crate, crock lids, crokinoe board, croquet mallet, cutting board, cash board.

Chair Caning. The Junior High School for Colored Children, at Coatesville, Pa., is featuring chair caning in its industrial department. The school issues a paper called "The Junior Messenger."

Classes for Machinists. Part-time classes for machinists' apprentices have been made a feature of the evening schools at Wheeling, W. Va.

ANNUAL MANUAL ARTS EXHIBITION, KERN COUNTY UNION HIGH SCHOOL, BAKERSFIELD, CALIF., MAY, 1921.
Mr. K. W. Rich and Mr. Walter Stiern, Wood-Shop Instructors.

BOYS AFTER-SCHOOL MECHANICS' CLUB.

J. B. Scott.

The Boys Mechanics' Club of Hackensack, N. J., was originally operated as a Wednesday after-school club. The interest of the boys and the inability of the teacher to withstand the interest-pressure caused it to develop into an "everyday afternoon school club." The club dues were made payable in the form of miscellaneous "junk", consisting of old pieces of lead, sheet metal, brass and copper tubing, asbestos, old clocks and discarded mechanical toys and parts.

The club has as its aim to give opportunity for individual creation and to provide for the development of projects resulting from the boy's own ideas and initiative. These are varied and their evolution is interesting as carried out. Boys having no special choice of work are given unfinished models left by other pupils. These include such projects as steam engines, electric motors, telegraph sets, suction pumps, pile drivers and derricks.

There are also members of the club consisting of those whose courses have been changed to printing or who have gone on to high school, and desire to return for the completion of their projects or the creation of new ones.

There is another group of boys who have a preference for projects suggested by the instructor and who are thereby given opportunity to experiment on new articles. Among these may be mentioned a large number completed for the mid-winter holidays, including an electric toaster, a reflector heater, an electric stove, an automobile engine heater, and a stop tail-light.

Reflector Heater.

The heater was made from a tin wash basin, with a wire guard in the center and a common six inch porcelain tube. Eighteen feet of No. 20 Chromel wire was coiled into a spring ¼ of an inch in diameter and twenty inches long. This was spiralled around the tube and the whole, with a proper connection mounted on a stand of wood fifteen inches high, composed of upright side brackets and half-lap base.

Electric Stove.

The electric stove serves also as a toaster and was quite popular with the boys. It was made of a shallow bread pan, with four screen-door knobs for legs. Into this was poured a mixture of one-third cement and two-thirds loose asbestos to a depth of one inch. On this a layer of thick sheet asbestos was laid. Over this was placed upright cross sections of ¼-inch asbestos, with ¼-inch holes drilled to receive spring coil Chromel wire, and filled in at the sides of the pan with short pieces of sheet asbestos to hold the crosspieces upright. One section of an old-type wire toaster or meat broiler from the five-an-ten-cent store fitted neatly over the top of the pan. An ordinary ceiling rosette mounted on the end of the pan cares for the extension cord.

Automobile Heater.

The automobile heater which may be placed under the hood of an engine or on the intake manifold makes it possible to start the engine on a cold day as readily as at any other time of the year. The heater is composed of two three-wire porcelain cleats, a six-inch porcelain tube to hold eighteen feet of spring coil No. 20 Chromel wire, stove bolts and three lengths of heavy wire, two lengths of which extend long enough to receive a split wood handle.

NEW BOOKS.

Forge Note Book.

Arranged by George J. Coleman, Lane Technical High School, Chicago, Ill.

This is a reference notebook which provides the student with the practical operations in forgework. Illustrations accompany the information on tools and the several operations and processes in blacksmithing. The book is a safe and helpful guide. Blank spaces are provided throughout to enable the student to make notes and sketches.

Automotive Repair.

Instruction Manual of Repair Jobs. By J. C. Wright, Chief Industrial Education Service for Vocational Education. Cloth bound, 530 pages. Published by John Wiley & Sons, New York City.

The automobile has become so important a factor in the activities of man that its constant efficiency service, as far as this may be effected in repairs, has become a matter of educational training.

The present volume is designed to meet a want in this direction. It deals with the physical phases of the modern automobile, the function of the several parts and their operation, affording training in making repairs. The author makes it plain that he has centered his efforts solely upon repair work rather than upon theory of design and the assembling of detail parts.

The work is divided in two parts, the first treating chassis, engine and electrical construction, and the second, theory of gas engines and of gases, lubricants, ignition, carburetors, tubes and tires, etc.

The injured parts come in for consideration, the parts that are bent, twisted or broken. Thus, the methods of mending, straightening, substituting and supplementing become the purpose of the text.

The book is liberally illustrated with parts and tools and with demonstrations and operations in repair labors.

Elementary Electric Wiring.

By B. B. Burling and A. M. Karweik. Paper, 8″x11″, 72 pages. Price, 75 cents. Bruce Publishing Co., Milwaukee, Wis.

This is the first book of the Burling Vocational Series of loose-leaf shop manuals and presents a series of practical problems based on the simplest forms of electric wiring used for domestic and industrial purposes. It begins with explanations of the electric bell and the dry cell battery and proceeds from the simplest one-bell circuit through all the simpler combinations of wiring bells and buttons to the more complicated call, burglar alarm, annunciator, return call and contact relay systems. There is sufficient text to make the related theory understood and there are ample directions to make the respective problems clear. The symbols for each system are reproduced in such form that the student may work out the wiring diagram in the book and retain the same as a guide in his shopwork and as a permanent record of his work. Ample questions are given for verifying the student's understanding of the principles involved in each diagram.

The book is the result of some years of successful experience in teaching boys in prevocational and vocational classes. Each of the authors has had extended trade experience so that the work represents not only the material which is essential from the educational standpoint but also from that of the practical journeyman.

Farm Buildings.

By W. A. Foster and D. G. Carter. Cloth, 5¼ x 8 inches, 377 and XV pages. Price, $3, net. John Wiley & Sons, New York.

Two practical agricultural engineers, one from the Middle West and the other from the South, have collaborated in the preparation of this most acceptable book on the location, design, planning, construction and repair of buildings for American farms. The book is primarily a text for college courses and a reference book for advanced secondary schools and practical farmers. It divides farm buildings into nine general classes,— barns, grain storage buildings, hog houses, poultry houses, silos, implement and machine shelters, ice houses, minor structures and farm homes—and proceeds to outline the essential requirements for the most useful and economical type of each. The authors have no pet hobbies and discuss very freely the advantages and disadvantages of the latest accepted systems of arrangement, construction and equipment and lead the reader to observe and to draw his own conclusions. The last one-third of the book takes up the problems of construction with wood, concrete and other materials, the mechanics of building construction, contracts and specifications, cost estimating, roof construction and framing, and a rich variety of practical details of carpentry and building construction.

The book reflects a complete grasp of the best present day engineering and building practice as applied to farm problems. It is written in simple, understandable style, and is splendidly free from over-emphasis on theory and unproven novelties. The economy of combining service, permanence, utility, sanitation and convenience with reasonable cost of materials is constantly emphasized.

The book is well illustrated with numerous photographs, plans, details of construction, tables and diagrams.

Supervisors' Notes of Classroom Visits.

Compiled by Charles A. Wagner, Ph. D. Price, 35 cents. The Bruce Publishing Company, Milwaukee, Wis.

This handy tablet outlines the general points in teaching which a supervisor may observe and record in classroom visitation.

NATIONAL VOCATIONAL GUIDANCE ASSOCIATION MEETS.

As a prelude to the annual meeting of the National Vocational Guidance Association, a dinner conference on placement was held at the La Salle Hotel, Chicago, the evening of Feb. 22nd. Called together by the junior Division of the United States Employment Service, the meeting was attended by a group of forty vocational directors, college professors and personnel and educational directors from business and industry. The opportunity and obligation of schools and employers to cooperate in the placing of juvenile workers was stressed, it being brought out that much of the early vocational experience of youth in business and industry is as truly educational as his previous school work.

The opening meeting of the convention, Feb. 23, was addressed by President Walter Dill Scott of Northwestern University who spoke upon Mental Alertness Tests for prospective freshman. Dr. Scott brought out the fact that mental alertness tests for adults are now quite generally recognized in practical personnel work and will be used more frequently as time goes on. Such tests are accurate, easily given and scored, and of high prognostic value when given to entering students. College courses as now conducted presuppose a time limit and mental alertness tests sort out and grade students for rate of work, making possible their grouping in classes of nearly equal ability. As the welfare of the student is the first consideration, such tests should be for the purpose of proper placement and not for elimination.

The other meetings on Thursday were concerned with the various phases of the essentials of a vocational guidance program. The preparation of occupational information and the methods of introducing it into the schools, essentials of a high school vocational guidance program, psychological tests, the use of job analyses in determining the significance of personal qualities, and educational guidance in music and art were among the topics covered. A resume of programs actually in operation in a number of cities gave much valuable data. A significant feature of all the meetings was the fact that ample time had been allowed for discussion of papers immediately after their reading, a provision which was made full use of.

Dr. John M. Brewer, associate professor of education, Harvard University, spoke at the annual banquet on "Tasks Just Ahead in Vocational Guidance." He brought out in vigorous fashion his belief that manual training is ripe for reorganization, advocating more brief, tryout courses and, as he phrases it, "less wood." The differences between the advocates of general and vocational education must be harmonized because both these forms of education are needed by a child. That the change from school to industry or business is now too sudden was also argued by Dr. Brewer who suggested an overlapping between work and school in a manner not now provided.

Friday was filled with meetings, both general and sectional, in which detailed plans of work now in progress were presented. Actual accomplishments in cities and rural communities, with papers describing scholarship aid for bright children, studies of industries in which children begin work, the keeping of adequate records and the value of placement work to employers were some of the matters considered.

The convention closed on Saturday with the business meeting and election of officers. Reports from the various branches of the Association (of which there are eight) were followed by the election of the following officers:

President, Miss Anne Davis, Vocational Director, Chicago, Ill.

First Vice-President, Mr. Edward Rynearson, Director of Vocational Guidance, Pittsburgh, Pa.

Second Vice-President, Miss Dorothea de Schweinitz, Placement Sec'y. Philadelphia, Pa.

Secretary, Miss Elizabeth Cleveland, Supervisor of Girls' Activities, Detroit, Mich.

Treasurer, Prof. Arthur F. Payne, University of Minnesota, Minneapolis, Minn.

Trustees, Dr. Ruth E. Clark, Vocation Bureau, New York, N. Y.; Mrs. Helen T. Woolley, Director, Merrill Palmer Fund, Detroit, Mich.; Miss Mary Stewart, Junior Employment Service, Washington, D. C.; Mr. Frederick J. Allen, Boston, Mass.; Miss Harriet E. Towne, Vocational Director, Lincoln, Neb.

The arrangements made to conduct visitors to schools of interest were greatly appreciated and taken advantage of by many. The exhibit was also a center of interest at all times and though not large was representative of the work and scope of vocational guidance in the United States.

Some of the high spots:

Promotion in the occupational world is always by selection and not as in school where all move up periodically.

Teachers in general should visit and get industrial contacts.

Vocational guidance is an attitude of mind. It is not an adjunct of the schools but foundation and superstructure both.

Too much use of guidance questionnaire blanks in many places.

Short synopses of various occupations are needed.

A better chance for the child with special ability.

Most positions are taken without real choice, to be given up when the desired opportunity arrives.

Placement is a test of guidance in that a youth, if properly placed, is satisfied and stays.

Proper placement often implies later readjustment.

Use avenues of approach to the student that he is familiar with.

Don't pick out too good a student for a job, and knowing the requirements, do not exceed them.

The N. V. G. A. is an organization made up of local branches as follows: New York, Chicago, Minneapolis, Cincinnati, Philadelphia, New England, California, Kansas City.

W. W. Ermeling.

OBSERVE TWENTIETH ANNIVERSARY.

Unusual Meeting of New York School Crafts Club.

The twentieth anniversary of the School Crafts Club was held in the Stratford House, New York City, on Saturday evening, February 18th.

Our twentieth birthday was marked by an annual banquet which was held in the new grill room. A most pleasing part of the program was the presence of most of the past presidents who were guests of the Club.

Dr. James P. Haney, who is the founder of the Club, spoke most interestingly on the great need of the organization during the early developments of Industrial Arts. Mr. Arthur N. Garritt succeeded by describing the early developments of the Club. Dr. Earnest B. Kent—The Club as an Agent for Expending Iudustrial Arts. Mr. Arthur W. Richards—Industrial Arts as a Means of Democratizing Education. Mr. Morris Greenberg—A Mission of the Club. Mr. Hugo B. Froehlich—The Correlation of Industries and Projects. Mr. Charles W. Ledley—The Development of the Round Table as a great Drawing Feature of the Organization. Mr. John J. Hatch How Will the Shop Teacher Cope with the New Developments in the Industrial Arts? Mr. Richard Beyer—on the splendid Cooperation between the Officers and the Members.

A most interesting letter was read by the secretary from Mr. William F. Vroom of St. Stephen, Canada. Mr. Vroom is an ex-president and charter member and from his letter we conclude he is deeply interested in the Industrial Arts, also in the success of the Club. We regretted very much that Mr. William Noyes, Mr. Fred P. Reagle and Mr. Merritt W. Haynes could not attend, due to their distance from New York, but appreciated their letters of encouragement and sincere regards for the excellent work that has been done.

Mr. Hugo B. Froehlich of Newark, N. J. was toastmaster and in his usual efficient way did justice to the occasion.

Mr. Martin Corcoran, our chairman, is to be commended on the complete success of the banquet which was enjoyed by a record attendance.—**Russell F. Hemion.**

Mr. James E. Gaffney, for the past ten years instructor of printing at Atlantic City, N. J., has resigned to accept a position with the Central Pennsylvania Typothetae as Director of their education department. Mr. Gaffney will have charge of the educational activities, including apprenticeship training and extension courses in central Pennsylvania.

NOW, ARE THERE ANY QUESTIONS?

This department is intended for subscribers who have problems which trouble them. The editors will reply to questions, which they feel they can answer, and to other questions they will obtain replies from competent authorities. Letters must invariably be signed with full name of inquirer. All questions are numbered in the order of their receipt. If an answer is desired by mail, a stamped envelope should be enclosed. The privilege of printing any reply is reserved. Address, Industrial-Arts Magazine, Milwaukee, Wis.

Varnish Troubles.

265. Q:—I wish to get some information on how to revarnish the body of an automobile for a first class job. Two different instructors of our school have tried, but failed to get satisfactory results. The trouble is in the minute, air cells which are formed when applying the varnish, which when rubbed down with pumice and water leaves a pitted surface or (Pocked marks). I had the same difficulty when I finished a walnut floor lamp, but I strained the varnish through a piece of fine linen cloth into a shallow bowl, and found that the results were much better. Straining did not help on the automobile job.—A. V. H.

A:—The questioner is experiencing the difficulties of large surface varnish work which has forced many manufacturers to install special finishing rooms, practically air tight, and which were supplied with filtered air of the correct humidity under standard conditions.

The basis of this expense lay in the fact that it is practically impossible to do high grade work, except under extreme conditions of cleanliness. The difficulties are due to three possible conditions:

First, there is great possibility that rubbing dirt—either from sandpaper, steel wool, or pumice stone, may not have been entirely removed by thorough washing down with the hose and chamoising off. If this condition is true, even in a slight degree, the varnish brush will inevitably pick up dirt left in crevices and corners and distribute it over varnished areas. In washing down, previous to succeeding coats of varnish, I have found it to be good practice to use a short bristle, three inch oval brush to aid the work of the hose. Excess water may be then chamoised off and the car body allowed to dry. At this stage, and immediately preceding the actual varnishing, the use of a "tacky cloth" has assumed a place in standard practice in automobile plants. This may be prepared by using a piece of new cheese cloth, saturated with varnish and wrung dry in much the same manner as excess water is removed from a wash cloth. By folding all selvage edges toward the inner side of the pad, this "tacky cloth" may be used to wipe up a panel just ahead of the varnish work. This will effectually remove fine dust or lint which will tend to mar the finish.

Second, the varnish room itself may be improperly cleaned. This means that all sash openings round the jambs should be plugged tight with some kind of packing to prevent dust from entering. The sash and jambs, head casings, etc., should then be wiped down with a sponge. The walls should be cleaned with damp hair floor brush as should also all standing trim, etc. The floor should be freshly mopped and when dry should be given a mop coat of paraffin oil. The car body should be mounted on horses and such portions as the hood and covers, etc., be removed and placed conveniently on separate horses. All work should be so arranged as to give the maximum light and working space. The room should be closed for at least two hours before varnishing is attempted. A "tacky cloth" should then be used just before varnishing the cowl, fender, door panels or body. Do not clean up too far ahead of the varnish brushwork.

Third, the greatest difficulty of all which confronts the car finisher is that of supplying absolutely clean brushes for each job of varnishing. This does not mean new brushes, which with their loose bristles and other brush-maker's dirt are the worst pest imaginable. Brushes for varnish work should be kept in a cabinet, which if nothing better is available, can be made from an ordinary varnish can. The primary requisite is that the brush shall be suspended in some practical manner, so as to enable its easy removal from the can, and to be replaced from time to time after use; so that the bristles will be completely covered as well as part of the ferrule, in a mixture of turpentine and waste varnish. I have found it a good practice to put the brushes in the can by suspending them on a wire in such a manner as to leave at least 1½" space between the ends of the bristles and the bottom of the can. The latter was then filled with clear turpentine up to a quarter inch above the ferrule end of the bristles. Any varnish left over from jobs was then poured into the can from time to time. In this manner the loss from evaporation and use is taken care of and the mixture gradually becomes a varnish body. This method enables the bristles to work freely while in suspension and all dust, varnish nibs, etc., will then settle to the bottom of the can which should be cleaned thoroughly once in three months. The major portion on the varnish-turpentine mixture should be carefully poured off, and saved in a clean container and the can thoroughly washed out with benzine or turpentine. Do not use a cloth in an attempt to wipe it clean. To do so means the introduction of an appreciable amount of lint, the bane of the car finisher's life. The care of the brushes is the greatest problem of all but where the above method is conscientiously followed, there are always clean brushes available. Never neglect a brush, by allowing varnish or other material to dry even for a short time. If this is neglected, partially hardened particles of varnish collect in the heel of the brush and rapidly work themselves into the finish when a panel is being varnished. A good workman will carefully wash out his brush in clean turpentine, using a smooth-edged, narrow putty knife to smooth the bristles out into a clean chisel form. Never distort a brush by forcing the bristles out of their natural alignment. Above all things, do not wash out brushes in water nor soak them in water from time to time as is so frequently done. This makes the bristles soft and flabby and altogether is an extremely ruinous practice. If a varnish brush can is not available, wash out the brush in turpentine; throw out the excess solvent from the brush by a quick downward throw of the arm; arrange the bristles with a comb or knife into their natural position and wrap carefully and flatly in a piece of clean glazed paper as ordinary foolscap. When laid away in a clean and even temperatured place, the brush will be available for immediate use. Long experience has convinced me, that even in the case of the man who does a few jobs now and then around home, that it is good economy to purchase high grade, rubber-set brushes, suited to the different types of work; prepare some form of varnish brush can and thereby always have suitable equipment ready for use. Above all this applies to the instructor in a school shop, whose duty it is to teach practical and accepted trade methods in addition to the question of self-fense in always having equipment ready for use under adverse conditions.

A suggestion at this point may also be of some value. On the last coat of varnish it is the practice in many piano and auto finishing departments to "pick the varnish". This is accomplished in one of two ways, of which the first consists in whittling an ordinary match stick to as long and slender a point as is possible. With this simple instrument tiny specks of lint, dust, or hardened varnish nibs may be lifted out of the varnish before it sets and the holes thus made will flow together free from blemish. It is these foreign substances occurring either from the dirty room, brushes, varnish, body, or clothing of the operator which cause the varnish to draw up in a small mound many times thicker than the surrounding varnish film. It will be readily appreciated that the under portions of these spots will be very much softer than the otherwise hardened film. When the sandpaper or pumice stone is used to rub the finish to a level surface, these small mounds are cut down and the soft core is pulled out, thereby causing the pitted or pocked marked surface which occurs with some types of varnishes. The only recourse in the case of a dirty varnish is to allow it to harden from one to two weeks, rough rub, stand one week and finish off. In some factories it is the practice to take old varnish and immerse a heavy cord therein until saturated. This is then removed as quickly as possible and stretched taut so that the fine threads of varnish which drip from the string may be allowed to harden in that form. As long as any of these strings or pencils of varnish are available, the string is allowed to remain

in position as a source of supply. Small portions of these hardened threads are pinched off and used to pick out lint, dust and nibs from the fresh varnish film. This is accomplished by simply touching the nib with the soft end of the varnish thread and withdrawing from the fresh surface which then flows together.—**Ralph G. Waring.**

Bleaching Reed and Cane.

Q: 267. Can you advise us how reeds are bleached. Is it done before or after weaving?—C. S.

A:—Reed may be bleached in a solution of chlorinated lime made up in the ratio of one-half pound lime for each gallon of water. The bleach should be made up cold in a wooden container in which there is no metal. Poplar is the best wood to use, and a trough twelve to eighteen inches deep and twelve to eighteen feet long is the best form of container. The reed is allowed to remain in the bleach 24 hours and is tnen rinsed in cold water.

BOSTON VOCATIONAL SOCIETY MEETING.

The Boston Vocational teachers and their friends left Rowe's Wharf, at 10:15 A. M., Saturday, February 11th, en route to Fort Banks, Winthrop, Mass., where the sessions of the February meeting took place. About 160 persons were present, including Messrs. Brodhead, Emerson and Hatch. The committee on arrangements provided tags for each guest and distributed dinner tickets for them.

At the Fort the guests were received by Captain Hackett and his staff. Assembled in the gymnasium they were treated to a program outlined by Captain Hackett. The party was then divided into groups and shown around the Post Schools and the Fort by non-commissioned officers. At 11:30 A. M. all assembled on the parade grounds to witness a formal guard mount, which was a credit to any military division. At 12:00 o'clock General Edwards arrived in camp, amid the thirteen-gun salute given in his honor. The general in his talk following the dinner, sounded a note of warning against what he termed "a wave of pacificism" which is sweeping over the country, and pointed out that this wave is more extravagant and more dangerous that that which preceded the war. He mentioned five principles which should be kept in mind in the interest of good citizenship, namely: A sound body and a sound mind; appreciation of the dignity of labor and of industry; self mastery and control; appreciation of our institutions and industries; appreciation of the other man's point of view. The general urged that in industry men play fair, keep to the line all the time, avoid false praise, give praise where praise is due, and demand efficiency.

General Edwards was followed by Major Avery French, of the Army Vocational School. The guests were treated to a moving picture program which was followed by dancing in the post gymnasium.—**Patrick J. Smith.**

THE SCHOOL CRAFTS CLUB MEETING.

The second regular meeting of the School Crafts Club of New York City was held at the Newark Technical High School, at Newark, N. J.

Preceding the meeting, the members were invited to inspect the radiophone department of the Westinghouse Electric & Mfg. Company at Newark. The trip proved most instructive and timely as all the teachers are interested in this new achievement.

Following the trip, the visitors assembled at the Newark Technical High School, where Mr. Rudolph Skrivanek spoke with much interest on "Transatlantic Achievements of Recent Date." Mr. Paul F. Godley, representing the Adams Morgan Company of Upper Montclair, N. J., followed with a very interesting talk on "Radio Relay."

Mr. Edwin F. Judd, of Upper Montclair, and Mr. John M. Dockstader conducted a round table showing the "Possibilities of the Radiophone as a Grammar Grade, High or Vocational School Project."

February 18th was celebrated by the Club as the twentieth birthday of the organization.—**R. F. Hemion.**

EASTERN ARTS TEACHERS MEET.

The Eastern Arts Association will hold its annual meeting April 6, 7, 8, at Rochester, N. Y. Rochester is a great home city and is famous for its junior high schools. The convention promises the usual good features and permits the visitors to see the Rochester schools in operation.

The exhibits will be housed in the new Madison Junior High School, where the general and sectional meetings will be held. Schools, hotels, and the local chamber of commerce are all cooperating in preparing the way for the most successful meeting.

The subject of the meetings will be "The Place of the Manual, Industrial, Household and Fine Arts in the Junior High School." Dr. Wm. T. Bawden, Assistant Commissioner of Education, Washington, D. C., will open the meeting with a conference. Among the many well-known speakers will be Mr. Arthur Dean of the Federal Board of Vocational Education, Dr. Hugo B. Froehlich, Mr. M. W. Haynes of the United Typothetae, Mr. Frank Alvah Parsons, and Mr. William H. Varnum.

CONFERENCE OF MANUAL ARTS INSTRUCTORS IN OKLAHOMA.

A state meeting of the manual arts instructors of Oklahoma convened on February 9, 10, and 11, in Oklahoma City, in joint meeting with the sixteenth annual convention of the Oklahoma Education Association.

Among the speakers who appeared before the body of men was Chas. W. Briles, State Director of the Vocational Education of the state of Oklahoma, who spoke relative to the work that was done in the state under his supervision. Mr. Briles has conducted classes in many parts of the state, especially in the oil and coal centers along the line of foremanship training. He cited many instances of the success that this type of training had met with, and stated that there is a great future for the man well prepared in this line of work. It is the intention of Mr. Briles to have conducted in this state, at A. & M. College, Stillwater, this summer a four weeks' course in the training of men in Vocational Education under Smith-Hughes Aid. Quite a large number present expressed their desire to attend this conference. Mr. Briles will be assisted by Professor DeWitt Hunt of Stillwater and other experts along this line of work.

Messrs. Mahlon C. Courtney, Director Manual Arts, Chickasha, and Professor John F. Lance, State Teachers' College, Weatherford, read papers relative to the need of a course of study in the manual training department. Mr. Courtney made the statements that there would be definiteness, a course of study would be an aid to the student, a course of study would be an aid to the teacher, a course of study would bring the high schools closer together. In Mr. Lance's paper he threw stress on the course of study that would be prevocational, or finding courses. These courses would be so as to give the student a short course in the many vocations, within a period of two years in the high school.

The subject of Mechanical Drawing was discussed by Mr. A. E. Phillips, Oklahoma City, relative to the type that should be taught in the grades, while Mr. F. C. McCullough, Tulsa, outlined the course that would meet the demands of the high school. Both of these men have had many years experience in the trade world as well as the schoolroom, and supervision of this subject. These papers were highly appreciated by the members present, due to the fact that each was a master of his subject and knew what was needed in the average school system in the state.

The subject "What Should be Taught in a High School Automobile Repair Course?", was brought out in a paper well prepared by Mr. W. C. Bender, Director of Shops, University Preparatory School. Mr. Bender was also a master of this subject, having had many years' experience in the teaching profession and knowing the automobile trade as he does, made an impression upon all who heard him.

Mr. A. C. Parker, head of the printing department, Oklahoma City, read an interesting paper that showed much preparation. Mr. Parker is starting this subject in the high school in Oklahoma City this year, and from his discussion of the subject it seems that the board of education could not have made a better selection. Mr. Parker has had many years in the printing business, having worked from the devil's position on up through the various steps in this trade.

"In What Form Should a High School Course of Study be Prepared?" was discussed by Professor L. K. Covelle, Stillwater, who has had charge of the woodworking department in the A. & M. College for a number of years, and from his own experience he gave an interesting discussion relative to his subject.

Officers elected for the coming year were: President, O. M. Martin, Director of Manual Arts, Shawnee; Secretary-Treasurer, Harry W. McKimmey, Head of Woodworking department, Oklahoma City High School.—**Hugh Norris.**